ELECTRICAL REVIEW

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Contents — 29th April, 1949

EDITORIAL—
Meeting Buyers' Demands . . . 679

BRITISH INDUSTRIES FAIR—
Plan of Birmingham Electrical Section . 690
Exhibits at Birmingham . . . 692
London Displays 722

ARTICLES—
Power System Protection. By G. F. L. Dixon, Graduate I.E.E. . . . 681
Overseas Electrical Trade . . . 731
Electronic Aids to Production . . 737

REPORTS—
British Columbia's Water Power . 683
B.E.A.M.A. Report 685
Civic Restaurant 686

REPORTS—*Continued*
Institute of Welding 744
Turbo-Electric Ships 744
E.R.A. Reports 744

NEWS SECTIONS—
Personal and Social, 687 : Commerce and Industry, 733 : Electricity Supply, 739 : Financial, 741 : Contracts, 747

VIEWS ON THE NEWS . . . 684

CORRESPONDENCE 689

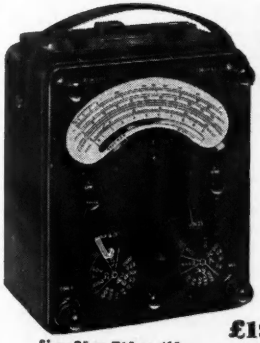
NEW PATENTS 745

NEXT WEEK'S EVENTS . . . 748

Classified Advertisements . . . 87

Index to Advertisers 102

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1. Telegraphic Address : "Elecrev, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (60 lines). Annual Subscription : Great Britain and elsewhere £3 0s. 0d. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW, and crossed "Lloyds Bank." Entered as Second Class Matter at the New York, U.S.A., Post Office.



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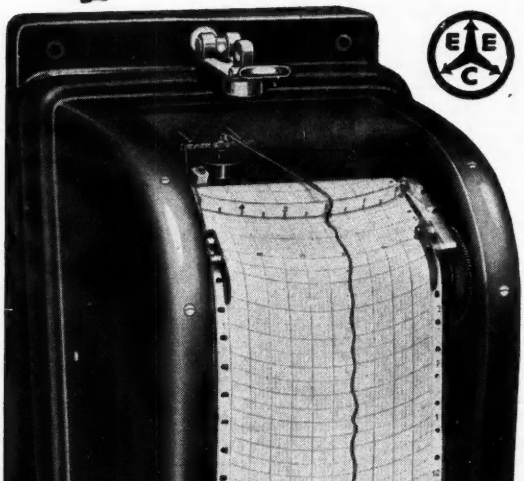

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER

ESTABLISHED 1872

Vol. CXLIV. No. 3727
29th APRIL, 1949

Meeting Buyers' Demands

BRITISH MANUFACTURERS' BID FOR EXPORTS

THE past two years have witnessed a remarkable transformation in the picture of the world's markets. In 1947 so great was the pent-up demand after the war that it was still possible to sell, within reason, practically anything the manufacturers could produce. Price and quality were a secondary consideration: all that mattered was delivery within a reasonable time.

By this time last year, however, it was becoming increasingly apparent that this "paradise" for the manufacturer was coming to an end. Buyers were becoming more discriminating and needed a certain amount of persuasion before they made their purchases. To-day no doubt whatever remains that the days of the sellers' market are departing. With increasing competition not only from other exporting countries but from expanding local production, it will henceforward be quality, price and, above all, the ability to meet customers' special requirements which will be the principal factors in selling goods abroad.

Rising Overseas Trade

That the electrical industry at any rate is succeeding, despite all handicaps in the way of import and other restrictions, in convincing countries overseas of the advantages of "Buying British" cannot be disputed. New records for electrical exports are constantly being set up and in January they attained a value of nearly £11½ million, no less than £3¼ million more than in the corresponding month of last year.

This satisfactory state of affairs is not, however, causing any relaxation of effort on the part of manufacturers who fully appreciate that trading conditions for them will not tend to improve, especially when they have to contend, as they will no doubt have to eventually, with the added competition from the revived German and Japanese electrical industries.

Studying Customers' Needs

Evidence of the intense activity of British manufacturers to produce apparatus specially designed to meet overseas conditions and tastes will be very conspicuous at the British Industries Fair which opens at Castle Bromwich, Birmingham, and Olympia and Earls Court, London, on Monday. In what must surely be the most comprehensive display of electrical equipment to be seen nowadays in Europe over 550 exhibitors will be showing items of electrical interest ranging from generation, transmission and distribution plant to every type of apparatus used in industry, commerce and the home. There will be some particularly good examples of electrical instruments on view exemplifying the highest accuracy and workmanship.

Although primarily intended to assist visitors to the Fair, the stand-by-stand guide appearing in this issue should prove of general service to indicate the numerous developments which, as a result of much patient consumer research, manufacturers have now made available.

A warm welcome is extended to all visitors to Castle Bromwich to use the

Electrical Review stand (C.614) in the Electrical Section as a meeting place or as an inquiry bureau. Staff representatives from all departments will be available throughout the whole period of the Fair to answer queries on technical and trade matters.

BROOME PARK

FRIENDS of the Electrical Industries Benevolent Association — firms and individuals — are being very helpful in the furnishing and equipment of the Association's residential home, Broome Park. A list just received shows that gifts including laundry appliances, a grand piano, a radio set, a refrigerator, books for the library, and household equipment have been made. No doubt others would like to follow the example of these benefactors—or to send the Association the monetary equivalent. We are told that the Broome Park residents are taking an active part in the social life of Betchworth, where the home is situated.

NOT GUILTY

BLAME for the shortage of power plant should not be laid at the doors of the manufacturers of turbo-generators. It is shown in the B.E.A.M.A. report for 1948-49 that a considerable amount of the plant produced cannot be taken immediately because the stations are not sufficiently advanced. This seems to be the principal reason why plant available for use was increased by only 503 MW last year, although the manufacturers produced 724 MW for B.E.A. stations. It may be that conditions in this respect will improve soon as the B.E.A. is taking over from the Ministry of Supply the responsibility for all progressing of power station work, although the Ministry will still allocate the materials.

DOMESTIC RESTRICTIONS

ANOTHER of the many matters touched upon in the B.E.A.M.A. report is the effect of electricity supply restrictions and purchase tax upon the sale of domestic electrical appliances. Cooker makers stepped up their production to meet the demand which was expected from the Government's housing programme. Unfortunately that demand was not experienced and the makers now find themselves with surplus capacity. It is in the interests of the national electricity supply service as well as the manufacturers and the public that more cookers should be installed and it is to be hoped that British Electricity will respond to the cooker makers' request for co-operation. It should also continue to press (with the manufacturers) for a substantial reduction, if not abolition, of the purchase tax on water heaters. As Mr. W. R. T. Skinner said at a recent meeting, water heating is a good way of storing electricity and it is a desirable load. There is no excuse for maintaining the tax on electric water heaters, especially as gas water heaters are treated more favourably.

ELECTRICITY BOARD MEMBERS

MUCH publicity has been given to a resolution passed at a conference of the National Union of Enginemen, Firemen, Mechanics and Electrical Workers expressing dissatisfaction at the composition of the Electricity Boards. It was complained that the Boards included too many people with no knowledge of electricity supply. In appointing the Boards the Minister of Fuel and Power has had to follow the lines laid down in the 1947 Act, and in our opinion he has done very well. If the generation of power was the Board's function the confining of membership to electrical engineers would perhaps be desirable, but the supply and distribution of electricity is a vastly different matter in which the views of many sections of the community must carry weight. We think that the electrical element in most Boards well balances the non-electrical representatives.

INSTALLATION SERVICE

MRS. EDNA WOOLLETT's letter in our last issue has drawn protests from electrical contractors who defend themselves and their fellows from the lady's accusation of unfair charges. We believe that all reputable contractors "play fair" with their customers, but we published the letter as a warning that contractors are being judged against supply authority standards and must give as good a service as the "local electricity showroom" if they are to succeed.

Power System Protection

The Negative-Sequence Filter

By G. F. L. DIXON, Graduate I.E.E., G.I.Mech.E.

THE development of protective gear over the last 30 years has tended towards emphasis on systems which depend for their operation on factors other than the plain magnitude of fault-currents. The most important trend has been the development of highly discriminative "differential" systems (usually employing pilot wires) which detect differences between the currents entering and leaving a machine or feeder. Another group of systems has resulted from the study of symmetrical components and detect one or the other of the two types of current or voltage component which arise under most fault or abnormal conditions; these are the negative phase-sequence components and the zero phase-sequence components.

Most engineers are familiar with the simplest of the phase-sequence devices (whose employment actually preceded the theory of symmetrical components). This is the common "earth-leakage" connection for relays, which can be regarded as feeding the relay with the sum of the three zero-sequence currents from the line current-transformers. In common with all phase-sequence devices, such a relay may have a fault-current setting far below the full-load current of the circuit it protects.

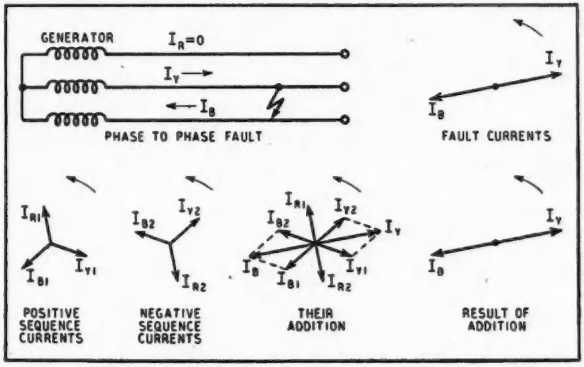


Fig. 1.—Analysis of currents due to a simple phase-to-phase fault

Negative-sequence devices, which appeared later, give protection against faults and abnormal conditions which are difficult if not impossible to guard against by other means.

The problem to be solved in all these cases is the detection of a phase-to-phase fault, or its equivalent, by a method which does not employ accurate response to the plain magnitude of the fault currents as does, for example, an over-current relay. By "equivalent" in this context is meant any condition which gives rise to the same qualitative distribution of phase-conductor currents as a phase-to-phase fault. One example of such an "equivalent" is the distribution of phase-conductor currents feeding the primary side of a delta-star transformer due to an earth-fault on the secondary side. Another "equivalent" exists within the distribution of conductor currents from a machine supplying any unbalanced load for which one conductor takes less current than either of the other two.

The currents due to a simple phase-to-phase fault can be analysed into two symmetrical three-phase systems of currents (Fig. 1), the positive-sequence I_{R1} I_{Y1} I_{B1} and the negative-sequence I_{R2} I_{B2} I_{Y2}. Negative-sequence protective systems are passive towards the first set of currents but detect the second. The filter network usually employed does this by passing I_{Y2}, the negative-sequence current of the yellow phase, through a relay which normally carries no current.

The four main applications of negative

sequence devices have been listed in "The Protective Gear Handbook" (M. Kaufmann) and are as follows:—(1) To protect a.c. generators against unbalanced loading. (2) To protect a.c. motors against electrical faults when the motors have long acceleration periods and high starting currents (precluding or making difficult the use of overcurrent relays). (3) To protect overhead lines against

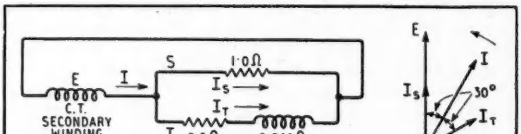


Fig. 2.—Basic circuit and current vector diagram for two arms of a negative-sequence filter

broken phase conductors when there is no earth connection or insufficient earth current to operate ordinary relays. Negative-sequence protection operates here by the resulting unbalanced load. (4) To protect transformer feeders against earth-faults on the secondary side when the latter is star-connected with neutral resistor and earth faults produce insufficient current to operate overcurrent relays at the supply end. Thus we have an alternative to intertripping, which uses valuable pilot wires, and fault-throwing switches, which are neither highly desirable in themselves, nor cheap compared with one relay.

In Fig. 2, current from a current-transformer secondary meets two parallel impedances, S and T, having the values shown, and divides into I_S and I_T.

It can be seen that

$$|Z_S| = \sqrt{(1.0)^2 + 0^2} = 1 \text{ ohm.}$$

and

$$|Z_T| = \sqrt{(.5)^2 + (.866)^2} = 1 \text{ ohm.}$$

Thus $I_S = I_T$ in magnitude.

Considering phase relationships, I_S is in phase with E, the current transformer secondary e.m.f., for Z_S is a pure resistance but I_T will lag E by an angle

$$\tan\frac{^1X_T}{R_T} = \tan^{-1}\frac{.866}{.5} = \tan^{-1}\sqrt{3}$$
$$= 60°.$$

The total current I must lie half-way between I_S and I_T since these two are of equal magnitude. Thus a current, on meeting such a pair of impedances, will divide into two equal currents, one leading the total current by 30°, the other lagging it by 30°. The values of the impedances need not, of course, be equal to those above to achieve the same result, provided they follow the same proportional pattern:—

$$R_S : R_T : X_T = 1.0 : .5 : .866$$

In the complete filter network (Fig. 3) the currents from the current-transformers are assumed positive when flowing towards the star-point X, the relay Q being regarded as a strap of negligible impedance. Current I_R meets two arms S and T, similar to those of Fig. 2, and divides into I_S and I_T, leading and lagging I_R by 30°. I_T flows straight to the star-point X but I_S must first pass through the relay. Similarly, I_B divides into I_U and I_V, I_U alone passing through relay. Thus the relay carries the sum of I_S, I_U and I_Y.

All the above distribution of positive datum-flows is common to three-phase currents of *any* phase-sequence. Fig. 4 shows how the three currents sum to zero for positive-sequence currents but sum to I_Y for negative-sequence currents.

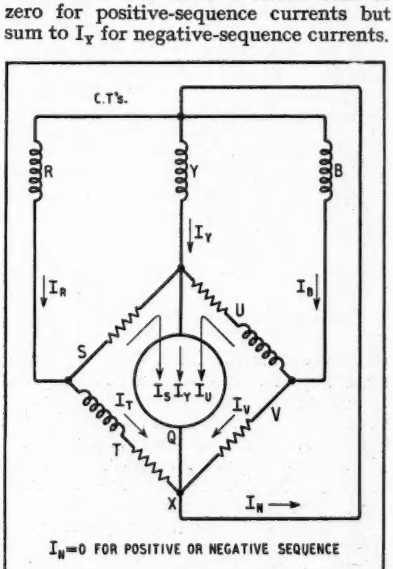


Fig. 3.—The complete filter network

As a practical economy, two current-transformers instead of three are often used for this type of protection. Thus current-transformer Y of Fig. 3 would be replaced by a plain wire, while the neutral lead would be deleted. The above explanation would be unaffected because lead Y, acting as a common return for current-transformers R and B, would carry the same current as if current-transformer Y were present, except during earth faults.

Commercially available schemes of this kind offer a standard filter network together with a detector relay and an adjustable-delay relay in a common case. The detector relay may be of the ordinary or super-sensitivity type. These give asymmetry settings of the order of 40% and 10% of full-load, and symmetrical three-phase stability limits of 7 and 3 times full load, respectively. However, these performances depend largely on current-transformer characteristics. The delay can be chosen to avoid mal-discrimination under heavy symmetrical faults or overloads. If protection is also required against symmetrical faults, a single-element overcurrent relay can be included with the above two relays in one case.

It may be noted that the filter described above will, in spite of its name, send zero-sequence currents through the relay in the event of earth faults. This can be verified from Fig. 3. For this reason, the delay must be chosen taking into consideration the operating times of earth-fault relays elsewhere. When choosing a delay for any form of negative-sequence motor protection, one factor to bear in mind is that the voltage vectors may be distorted by supply faults.

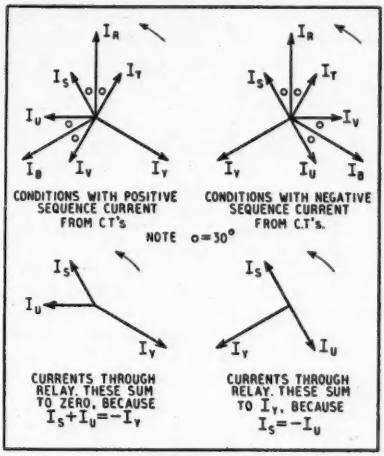


Fig. 4.—Vector diagrams showing relay inoperative to the positive-sequence and operative to the negative-sequence components.

British Columbia's Water Power

Bridge River Development

THERE is nothing comparable in Canada to the Bridge River power development, according to Mr. T. Ingledow, vice-president and general manager of the B.C. Electric Railway Company. When completed, this $17,000,000 project will have a capacity of 620,000 h.p. in ten generating units; one is already operating and two more will be commissioned this year.

Mr. G. Downton foresaw the possibility of developing Bridge River as early as 1912, and work actually got under way in 1926. B.C. Electric Railway Co. engineers completed the driving of a tunnel through Mission Mountain in 1929, but work was stopped two years later by the economic depression, being resumed in 1945.

The Bridge River rises on the eastern slopes of the Coast mountains and flows in a generally eastward direction to join the Fraser River above Lillooet. In the last 15 miles of its course, the river falls approximately 1,400ft; at one point it approaches Seton Lake, from which it is separated by less than three miles, but the river is at over 1,200ft higher elevation. The potentiality of this site as a power source lies in the diversion of the river flow into Seton Lake, by means of a tunnel over 13,000ft long through Mission Mountain. In its middle reaches, the river flows with only a slight fall through two valleys which are excellently suited to form storage reservoirs for future regulation of the river flow.

Ultimate development will require three dams, one of which—the diversion dam—was completed last year. Construction is progressing on the first of two storage dams which will be necessary to regulate river flow. The first dam is being erected at La Joie Falls, 40 miles upstream from the tunnel intake.

Views on the News

By REFLECTOR

TOWN rates nearly everywhere continue to soar. Some local authorities however, are finding that there is one avenue of economy which can result in an even better service. I refer to street lighting electrification, where the existing system is gas. Lewisham Borough Council is undertaking such a conversion (the sanction of the Ministry of Transport having at length been received after nine months of correspondence and negotiation). It is estimated that there will be an annual saving of £3,390 in lighting maintenance costs. The installation itself will cost some £15,000, and after allowing for ten years' loan charges the saving in that period is likely to be in the region of £17,000.

★ ★ ★

The April issue of *Registration* (the official review of the National Register of Electrical Installation Contractors) says that there have been "explanatory discussions" with the British Electricity Authority and Electricity Boards but the Register has had to take its place in the queue of matters which those authorities have to consider. The authors of articles in this number include Miss A. Lockhart (E.A.W.) and Mr. V. W. Dale (E.D.A.) and there are some notes on common installation faults beginning with "Serious and inexcusable over-rating of mains, etc.," and ending with "Switch on live side"—which I don't believe was meant that way.

★ ★ ★

I have received a copy of the first issue of the *Live Wire*, the official magazine of the Royal Naval Electrical Branch—a very well-produced journal edited by the Rev. W. G. Sandey, C.F., R.N. The articles range from personal notes (including one on Rear-Admiral (L.) S. L. Bateson, the first "L." officer to reach flag rank) to articles on ships and training, and there are many reports of social activities. It is hoped to reach all present and past members of the Electrical Branch; others may require a glossary. It is proposed to publish the *Live Wire* three times a year. It is obtainable at 1s a copy (or for 3s 6d a year) from the Editor, H.M.S. *Collingwood*, Fareham, Hants.

★ ★ ★

Referring to my note of 15th April in a letter in the *Spectator* relative to overhead lines in rural areas, a correspondent contends that the figures quoted were misleading. They covered 132 kV lines only, he says, but "we light our lamps at 230 volts" and it is the lower-voltage lines that disfigure English villages. There was no deception, but my correspondent is right in suggesting that the cost of putting the low-voltage lines underground is not so great. But there still exists a substantial difference between the costs of overhead lines and underground cables. Concealment is desirable but who should pay for it?

★ ★ ★

The latest Electricity Board journal to make its appearance is that of the London Board. In this case there has been no straining after a humorous or otherwise "appropriate" title; it is just called what it is—*London Electricity Board Magazine*. It is very handsomely produced, with some good illustrations, and the editor is Mr. John Langdon-Davies. Among the contents are a biographical sketch of the Board's chairman (Mr. H. J. Randall), a conversation with Sir Giles Gilbert Scott on power station architecture, and some notes on the supply and use of electricity at St. Bartholomew's Hospital. The magazine is to be a quarterly publication.

★ ★ ★

The *Electrical Review* Information Department tells me that from time to time it receives inquiries for the makers of small Edison screw lampholders, but has so far been unable to discover any in this country. I should not think that this type of lamp is in very common use, although I seem to recall that I have seen them in electric signs in the past. Apparently the relaxation of the lighting restrictions has resuscitated the demand for information about these holders. It is emphasized that they are the *small* not the *miniature* kind of Edison screw.

Electrical Manufacturing

B.E.A.M.A. REPORT FOR 1948-49

A YEAR of great and increasing activity is covered in the 1948-49 Report of the British Electrical and Allied Manufacturers' Association presented at the annual meeting on 22nd April by Sir George Nelson, chairman of the Council, who reviewed the principal events of the year.

The report shows that the membership was raised by 23 to 352 during the period.

Manufacturers of turbo-generator plant have not only met the demands of the home market, but have also exported plant to the extent of two-thirds of that amount.

During the past year members despatched 1,110 MW of plant of which 724 MW was for the British Electricity Authority. As the B.E.A. was not able to accept delivery in some cases as sites and stations were not ready, a considerable amount of plant has had to be stored. For this and other reasons it was possible only to increase the plant available for use by the B.E.A. by 503 MW during 1948. The Heavy Electrical Plant Committee, on which the Association is represented, has continued its periodical meetings and has provided a useful opportunity of calling attention to causes which impede plant production, including the shortage of skilled labour and particularly of draughtsmen.

In a reference to the B.E.A. Co-ordination Committee it is mentioned that the Authority is to take over from the Ministry of Supply, in the early summer, all progressing of work in hand.

The Association has continued to stress the imperative need for permitting sufficient capital expenditure and allocating the necessary steel and other requirements for ensuring an adequate supply of electricity, without which national economic recovery is not possible.

Domestic Appliances

There has been a substantial fall in demand for light equipment and appliances because of electricity restrictions and purchase tax. Representations have been made to the authorities drawing attention to the damaging effect of this upon export trade.

A marked improvement has occurred in the raw-materials position, especially in the supply of normal grades of electrical sheet steel, although supplies of certain other materials are inadequate. Shortage of suitable manpower is a continuing handicap. Highly trained men have been attracted to the nationalized industries. A strain has been put on members' training schemes and has reduced output.

Trade conditions at home and overseas have generally tended to become more difficult, and they continue to receive general and statistical study by the Association as a guide to future activities. German and Japanese competition is reviving and, in spite of assurances as to prices, their entry into export markets must have a marked effect. The Association's export department has been enlarged and an Appliances and Installation Equipment Division formed.

Action on New Legislation

The Council decided to inform the Federation of British Industries that it was undesirable to renew the undertaking given to the Chancellor of the Exchequer to limit dividends. A committee has been set up to consider the activities of B.E.A.M.A. in relation to the terms of the Monopolies and Restrictive Practices Act. Amendments to the Iron and Steel Bill suggested by the Association are to be moved at the third reading of the Bill. An assurance has been received that the industry will be consulted at the drafting stage of any regulations issued under the Wireless Telegraphy Bill.

Negotiations are continuing with the Board of Trade to secure the abrogation of the Order controlling prices and distribution margins of light electrical apparatus.

Relations with the British Electricity Authority are described as cordial and some details are given of the work of the joint committee and sub-committees. Reference is also made to the forthcoming British Electrical Power Convention at which two B.E.A.M.A. papers are being presented.

The second section of the report is devoted to export matters and attention is drawn to the services available to members in the Export Department. Reference is made to successful tariff negotiations in Australia in relation to vacuum cleaners and heavy-duty circuit breakers. Other matters touched upon are the work of the Export Panel; electrical exports in 1948; export targets; bilateral trade agreements; import restrictions; U.K. Engineering Mission to Canada; the economic recovery programme; and B.E.A.M.A. Overseas Committees (new Committees are being set up in Malaya and Argentina, and others in New Zealand and Pakistan are under consideration).

Section 3 deals with the activities of the various Council committees—Contract Conditions, Education, Electric Welding Industry, Materials, Publicity, Standardization

and Traffic. The Sections are dealt with in Section 4. Reference is made to the efforts of welding electrode manufacturers to satisfy home requirements, which has had an adverse effect upon exports of both electrodes and arc welding plant. There has been a fall in demand for electric cookers, and the makers are asking the B.E.A. and Area Boards to help to alleviate the position. Hope is expressed that the restrictions on space heater production will be eased. It is noted that high quality goods are returning to favour in place of the shoddy products which appeared just after the war.

During the year the Industrial High-frequency Heating Equipment Section was formed and it has been decided to establish a new section to cover hydraulic turbine makers.

The fifth section covers the work of the technical committees much of which is concerned with the standardization and interchangeability of apparatus and components in a wide variety of directions. The last two sections briefly record the work of allied and kindred associations during the past year.

The ballot for eight members of the Council resulted in the election of Allen West & Co., Ltd., British Insulated Callender's Cables, Ltd., Bruce Peebles & Co., Ltd., Crompton Parkinson, Ltd., the English Electric Co., Ltd., the Hackbridge & Hewittic Electric Co., Ltd., Johnson & Phillips, Ltd., and C. A. Parsons & Co., Ltd.

At the first meeting of the Council for the 1949-50 session Mr. H. W. Bosworth (Lancashire Dynamo & Crypto, Ltd.) was elected chairman and Mr. J. S. Ramsden (British Thomson-Houston Co., Ltd.) vice-chairman.

Civic Restaurant

ALL-ELECTRIC KITCHEN EQUIPMENT

PRACTICALLY all the services in the new Civic Restaurant which is being formally opened at Stanley, Co. Durham, tomorrow (Saturday) by Councillor Mrs. E. Brass, chairman of the Urban District Council, are electrically operated. The kitchen is completely all-electric and incorporates the latest equipment for cooking, water heating, food preparation and refrigeration.

Jackson cooking equipment at the new Stanley Civic Restaurant

The cooking equipment (manufactured by the Jackson Electric Stove Co., Ltd.), comprises a 30 kW cooker, with thermostatic oven control, a two-pan 16.2 kW fish fryer, two 5.1 kW steaming ovens, a 10 kW bench model grill, three 20-gallon vegetable boiling pans, two hot cupboards, and a double-deck pastry oven loaded at 7.9 kW with thermostatic oven control. For water boiling and coffee making, there is a "Stott's" coffee set, with two-gallon side milk and coffee urns, with a total loading of 12.2 kW. The food-preparing machinery includes a Hobart potato-cleaning machine and a mixing machine. The refrigeration equipment is a 100 cu ft Frigidaire cold room constructed on sectional principles. For the supply of hot water, four 30-gallon and one 3-gallon "Sadia" storage heaters have been installed.

The restaurant has seating capacity for 200 people and it is electrically heated by two 15 kW "Heatovent" fan heaters. In addition, five 8ft single-tier "Tuvec" heaters, wall mounted, and loaded at 1.2 kW each, are installed under the windows on the north side of the restaurant. The electricity supply for the restaurant is 3-phase 415/240 V, taken from a nearby sub-station. The kitchen was designed by the Department of the Engineer and Surveyor, in association with the North-Eastern Electricity Board, which has been responsible for the supply of the electrical equipment, and for the installation work.

PERSONAL and SOCIAL

News of Men and Women of the Industry

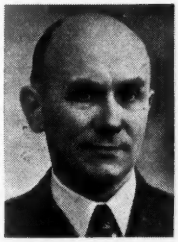
AT last week's meeting of the Institution of Electrical Engineers the Kelvin lecture by Professor N. F. Mott was preceded by the presentation of the Valdemar Poulsen Gold Medal of the Danish Academy of Technical Science by the Danish Ambassador, His Excellency Count Eduard Reventlow, to **Sir Edward Appleton,** and the presentation of the certificate of honorary membership of the Institution to **Mr. J. M. Donaldson,** M.C., by Mr. T. G. N. Haldane, the president, who also presented the Faraday Medal to **Mr. C. S. Franklin.**

Mr. E. J. Robertson, B.Sc. Tech., A.M.I.E.E., former electrical engineer in the Manchester Corporation Transport Department, who left for Canada in February, is now with the Electrical Engineer's Department of the Toronto Transportation Commission, 35, Yonge Street, Toronto.

Mr. J. G. Helps, of the Northern Divisional Coal Board, was elected president of the Cumberland sub-branch of the Association of Mining Electrical and Mechanical Engineers at the recent annual meeting at Workington.

Mr. T. Kirkham, of Ericsson Telephones, Ltd., was elected chairman of the Telecommunication Engineering & Manufacturing Association at the annual meeting held on 21st April, in succession to **Mr. R. E. Robinson,** of the General Electric Co., Ltd. **Mr. F. A. Lawson,** of Siemens Brothers & Co., Ltd., was appointed vice-chairman.

As we reported in our issue of 1st April, **Mr. J. W. E. Rutherford** is the president of the Electrical Wholesalers' Federation for 1949-50. Mr. Rutherford is associated with Adamson & Co. (Tyne), Ltd., and took office on 27th April We reproduce his portrait herewith.



Mr. J. W. E. Rutherford

Mr. A. D. Sharp has been appointed chairman of Rashleigh Phipps & Co., Ltd., in succession to Col. W. A. Bristow, whose death we recently reported.

In the notice relating to **Mr. H. C. Goodman's** appointment to E.M.I. Sales & Service, Ltd., which was published in our issue of 1st April, we should have stated that he has been appointed assistant home sales manager of His Master's Voice Radio & Television Division.

Mr. R. C. Plowman, M.I.E.E., executive director of the British Thomson-Houston Export Co., Ltd., retired on 16th April after thirty years' service with B.T.H., all in connection with overseas trade. Mr. Plowman received his early education at Owen's School, and technical training at Finsbury Technical College under Processor Silvanus P. Thompson. He served an apprenticeship with the Wallsend Slipway & Engineering Co., Ltd., before taking appointments with London United Tramways, the L.C.C. and Tyler & Freeman (electrical contractors). In 1911 he joined the Overseas Department of A.E.G. in Berlin and was for a time on their engineering staff in Mexico.

Mr. R. C. Plowman

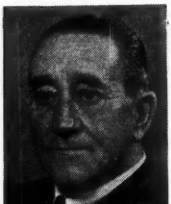
He joined the B.T.H. Export Department, Rugby, in 1919, being made responsible at Rugby for export business in 1934. On the formation of the B.T.H. Export Co. in 1947 Mr. Plowman was appointed executive director, and in the same year he visited South Africa and initiated the formation of the British Thomson-Houston Co. (South Africa) (Pty.), Ltd.

Mr. E. V. Small, previously director and general manager of the British Thomson-Houston Export Co., has been appointed managing director. To fill the vacancy caused by the retirement of Mr. Plowman, **Mr. J. N. MacDonald,** manager of the London office of the B T.H. Export Co., has been appointed to the board as executive director. The administration of all overseas representation, which was previously carried out by Mr. Plowman, is being undertaken by **Mr. C. W. Peyton,** who has been appointed manager, Overseas Representatives and Agencies, Rugby.

On account of the increase in volume and diversity of equipment being shipped overseas, two other appointments have been made. These are, **Mr. H. E. Wethered** as manager, Eastern Sales (covering the Middle East, the Far East, Africa, Australia and New Zealand) and **Mr. W. C. Scott** as manager, Western Sales (covering Europe,

Russia and the Americas). Their headquarters are the London office of the B.T.H. Export Co.

Mr. W. T. Ditcham, A.M.I.E.E., M.I.R.E., one of the senior engineers of Marconi's Wireless Telegraph Co., Ltd., who has been particularly associated with the building of broadcasting transmitters, retired at the end of March. He began his radio career in 1906 with the De Forest Wireless Telegraph Syndicate, which later acquired the Poulsen arc patents and became the Amalgamated Radio Telegraph Co. During this period he was in charge of experimental wireless stations at Oxford, Cambridge, and Shoeburyness. Following the winding-up of this company he joined the British Radio Telegraph Co. and, in 1912, became associated with the Grindell Matthews Wireless Telephone Syndicate and developed a system of quenched spark telephony. Early in 1915 he joined the Marconi Company and became associated with Mr. H. J. Round in the development of direction finders. Mr. Ditcham was commissioned in the R.N.V.R. in 1916 and, in 1917, was in the Intelligence Division at the Admiralty with the rank of lieutenant commander.



Mr. W. T. Ditcham

Mr. Ditcham was closely associated with the initiation of broadcasting in this country in 1920, and operated the experimental service from Chelmsford. Up to the commencement of the last war he was in charge of the Marconi Co.'s broadcast transmitter development and after the war acted as personal assistant to the development manager and (later) to the engineer-in-chief. During his career Mr. Ditcham has filed many patent specifications. He represented the Marconi Co. on the Radio Communication and Electronic Engineering Association.

Mr. J. H. Hoare, a principal of Thynne & Macartney, has been appointed a director of the City Electric Light Co., Ltd., Brisbane, to fill the vacancy caused by the death of Mr. P. J. O'Shea, which is reported below.

Obituary

Mr. P. J. O'Shea.—The death occurred on 5th February of Mr. Patrick Joseph O'Shea, who had been a director for sixteen years of the City Electric Light Co., Ltd., Brisbane.

Wills

Mr. B. Price, O.B.E., D.Sc., F.C.G.I., M.Inst.C.E., M.I.E.E., of Johannesburg, resident director of the Victoria Falls and Transvaal Power Co., who died on 9th July last, aged seventy-one, left estate in Great Britain valued at £69,991 gross (£67,117 net). Among the bequests are £40,000 to the University of Witwatersrand, desiring, but creating no trust in the matter, that it be used to augment the revenue endowment fund of the Bernard Price Institute for Geophysical Research, and £60,000 to the University, desiring that it be used in continuing the work of the Bernard Price Palæontological Foundation.

Mr. E. B. Vignoles, M.I.E.E., a founder and past chairman of Evershed & Vignoles, Ltd., and past chairman of the British Electrical & Allies Industries Research Association, who died on 10th November, left £61,175 gross (£59,458 net). Among his bequests is £50 to the Benevolent Fund of the Institution of Electrical Engineers.

Mr. E. Crocker, late electrical engineer with the Birmingham Corporation, who died on 2nd January, left £785 gross (£700 net).

Mr. G. A. Robertson, M.I.E.E., for many years chief electrical engineer to Herbert Morris, Ltd., crane makers, who died on 25th October, left £2,096 gross (£1,895 net).

Mr. A. E. Springer, superintendent of general outside contracts in the London area for Johnson & Phillips, Ltd., who died on 28th November last, left £5,115 gross (£5,066 net).

Mr. W. G. Haywood, of W. G. Haywood & Co., manufacturing electrical engineers, managing director of Haywood Foundries, Ltd., who died on 22nd March, 1948, left £54,452 gross (£38,448 net).

Mr. F. H. Livens, J.P., M.Inst.C.E., M.I.Mech.E., late vice-chairman and chief engineer of Ruston & Hornsby, Ltd., vice-president of the Institution of Mechanical Engineers, 1929-1937, who died on 30th October, left £71,167 gross (£69,467 net).

E.I.B.A. Appeal

A DIRECT appeal to non-manual workers in the various branches of the industry is being made by the Electrical Industries Benevolent Association, 32, Old Burlington Street, W.1, by means of two pamphlets. One is couched in humorous terms with a final serious note; the other sets out in an effective way the activities of the Association in many directions and its pressing need for funds. It is stressed that one day the recipient of the pamphlet may need the Association's help himself.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Charges for Electrical Work

IT seems that your correspondent, Mrs. Edna Woollett, was unfortunate in her choice of an electrician, who demanded cash and gave no receipt. On the other hand, 10s 6d was not an overcharge if the electrician had to travel two miles to attend to the lady's requirements.

All electricians or electrical contractors have standard rates for jobbing which have been arranged from time to time by the Electrical Contractors' Association and any bona-fide contractor will only be too pleased to quote those rates. The supply authority's electrician is an entirely different matter because, what the authority loses on the swings is easily made up on the roundabouts.

I would advise Mrs. Woollett that the next time she requires the services of an electrician to get into touch with any of the many bona-fide firms of electrical contractors in or near her area.

It has to be understood, of course, that if a contractor has to "lift" an electrician off a contract to attend to an urgent breakdown in a house or elsewhere, the cost of time must be borne by the person or persons requiring attention.

ALEX MILNE, SENR., A.M.I.E.E.
Glasgow.

I AM very surprised that a trade journal of the standing of the *Review* should publish such a silly letter as the one on the above subject in this week's issue.

The private contractor is reported as having "fiddled with the fuse board" for half an hour while the local electricity showroom man, presumably the B.E.A., "gave the wiring a thorough check and renewed two fuses" in twenty minutes.

The rest of the letter is meaningless, excepting as an attempt to boost nationalization. FRED H. JENNINGS.
Dudley.

MRS. EDNA WOOLLETT'S pen would have been better employed had she headed her letter "Charges for Electrical Supplies" and used her venom on the unnecessary increase in the cost of electricity with which she is supplied by the "local electricity showroom" instead of picking out an isolated case and condemning all private enterprise electricians.

Regarding her last paragraph, the conditions of labour in the industry are laid down by the National Joint Industrial Council for the Electrical Contracting Industry and they are stuck to by reputable electricians who have not lost their good name or business.

If she would like a list of reputable electricians in her district who would not require cash and would give her a receipt and details as to how the invoice is made up, I shall be happy to oblige her.

Surrey. PRO BONO PUBLICO.

"Cobra" Decay Arrester

IN a recent issue of your journal there was an advertisement for "Cobra" treatment of wood transmission line poles. This contains a statement that over 30 per cent of the poles in this country are already attacked by decay. I am interested to know how this figure was arrived at.

A creosoted wood pole has a life of from 35 to 40 years, and in view of this the above statement does not appear to me to be quite accurate.

I have no doubt as to the ability of several processes to arrest pole decay. An important point to be borne in mind is that, although decay which has started may be arrested, nothing can recover the lost strength of the part of the pole which has already decayed.

The needs of transmission and distribution engineers have been met adequately by creosoted poles at a reasonable cost, and, unless the economics in the future change drastically, I cannot see any substitute. J. MCCOMBE.
Leeds, 8.

Engineers' Guild

A MEETING, open to all chartered civil, electrical and mechanical engineers, is to be held at 7 p.m. on 6th May at the Institute of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow, C.2, to discuss the establishment of a Scottish branch of the Engineers' Guild. The chairman will be Mr. W. Linn and the speakers Messrs. R. Chalmers and J. H. W. Turner, members of the General Council, all civil engineers.

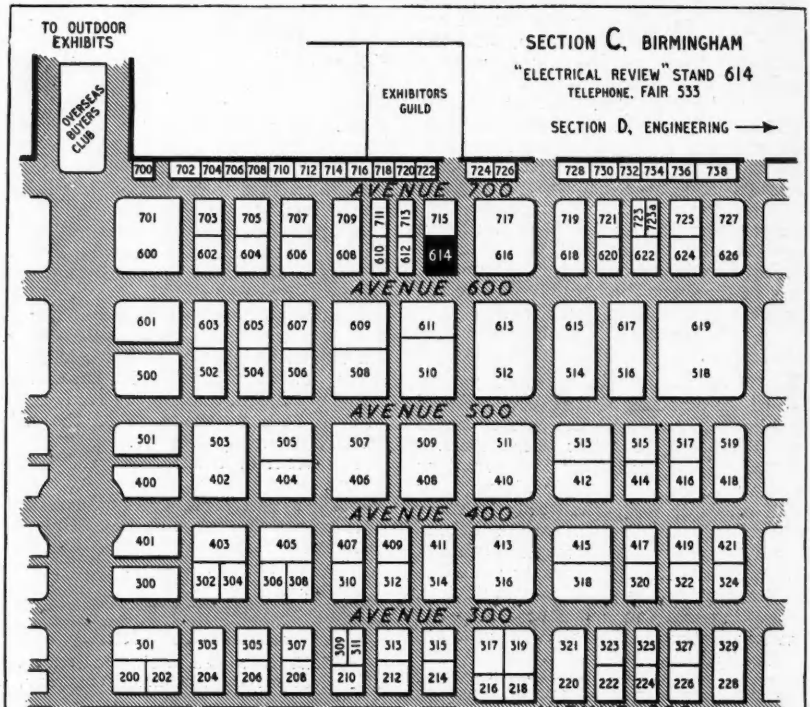
BRITISH INDUSTRIES FAIR

Stand-by-Stand Guide to the Electrical Exhibits

IN the following pages brief details are given of the electrical exhibits at the British Industries Fair which is being held from next Monday until Friday week, 13th May. At Castle Bromwich, Birmingham, apart from the 242 stands in the Electrical Section (C), there are nearly as many displays including items of electrical interest in the other sections—Hardware (A), Building (B) and Engineering (D). In London the Olympia Section contains lighting fittings, electrical instruments, clocks, electro-medical apparatus, and radio and television equipment, while at Earls Court there are vacuum cleaners and plastic products.

The *Electrical Review* stand C.614 (telephone: Fair 533), in the same place as last year, is again available as a meeting place and inquiry bureau.

To avoid overcrowding of the exhibition buildings while buyers are touring the stands, new arrangements have been



Aerofilm photo.

A good idea of the relative positions of the various sections of the Fair at Castle Bromwich, Birmingham, is obtained from this picture taken from the Main Entrance end. The Outdoor Sections are seen on the left.

made this year for the admission of the public. At Castle Bromwich the public will be admitted from 2 to 6 p.m. daily except on Saturday, 7th May, when they will be allowed in all day, and on the last day of the Fair, Friday, 13th May, when the closing time will be 4 p.m. The price of admission will be 2s 6d. The London Section will be open to the public all day on Wednesdays, 4th and 11th May, and on Saturday, 7th May, the prices of admission being 1s 6d for Earls Court and 1s 6d for Olympia.

In addition to special trains from Euston direct to Castle Bromwich at 8.20 a.m. (3rd class) and 8.45 a.m. (1st class), returning 6.5 p.m. (3rd class) and 6.10 p.m. (1st class), arrangements have been made for air travel between the London and Castle Bromwich sections of the Fair. Three airlines will operate between Croydon, Hendon and Castle Bromwich airfields on each day of the Fair except Saturday, 7th May, and Sunday, 8th May. A fourth airline will link Cardiff with Castle Bromwich.

The Fair will open as usual without ceremony but on the first day Mr. Harold Wilson, President of the Board of Trade, will preside at a Mansion House banquet.

Exhibits at Birmingham

WIDE RANGE OF ELECTRICAL PRODUCTS

A.C.E. Machinery, Ltd., Porden Road, London, S.W.2. **D.235.**—New push-button operated platform and hopper hoists of 2-10 cwt capacity for vertical hoisting of bulk material, drums, cases, sacks, etc., are seen working, together with a 5cwt general-purpose portable winch and a vibratory screen.

Acru Electric Tool Mfg. Co., Ltd., 123, Hyde Road, Manchester, 12. **C.209.**—Transformers, electrodes, soldering irons, heating elements, welding machines and accessories, relays, hand dryers, thermostats, electrical contacts, etc.

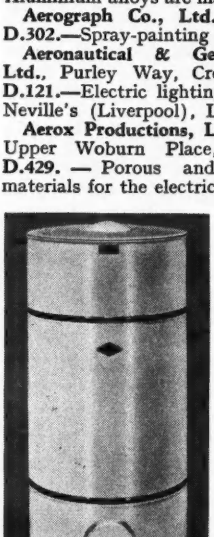
Aeraspray, Ltd., 179-213, Thimble Mill Lane, Birmingham, 7. **D.734.**—Equipment for electrostatic painting, air compressors, water wash spray booths, etc.

Aerlec (Aluminium), Ltd., 12, Greek Street, London, W.1. **A.524.**—Products of the company's foundries can be inspected. Aluminium alloys are made to requirements.

Aerograph Co., Ltd., London, S.E.20. **D.302.**—Spray-painting equipment.

Aeronautical & General Instruments, Ltd., Purley Way, Croydon. **B.606** and **D.121.**—Electric lighting fittings. See also Neville's (Liverpool), Ltd.

Aerox Productions, Ltd., Central House, Upper Woburn Place, London, W.C.1. **D.429.** — Porous and vitreous ceramic materials for the electrical industry, electrolytic processes, etc.



20 gal UDB/BT "Sadia" water heater with built-in cold water tank (Aidas)

Aidas Electric, Ltd., Rowdell Road, Greenford, Middlesex. **C.103.** — The U.D.B. range of water heaters now includes 35 and 40 gall models for industrial purposes, especially for dairy use, canteens and agricultural establishments. For flats, etc., the whole U.D.B. range from 20 to 35 gall is now available with built-in tanks for cold water (illus.). These types eliminate vent or expansion pipes and can be fed with cold water from a common down-service pipe. The coal-electric type water heaters are also now being supplied in 35 and 40 gall sizes and with built-in cold water tanks. The appearance of both U.D.B. and C.E.L. types has been improved.

Air Industrial Developments, Ltd., Aidspray Works, Shenstone, Staffs. **D.114.**—Compressors, spray painting and industrial finishing equipment.

Airscrew Co., Ltd., Weybridge, Surrey. **D.726.**—Windmill electric generator fans and a new "Vecta" 7in window fitting fan are among axial flow, centrifugal cooling tower and wind tunnel fans, as incorporated in ventilating, air conditioning, kilning and dust-collecting units. The new A.P.D.B. aluminium fan incorporated in an axial flow unit is adjustable for pitch, diameter and blade number.

Aiton & Co., Ltd., Stores Road, Derby. **D.608.**—Accompanying plain, corrugated and creased steam pipes for use in power stations is a 27in bore by 2in thick by 15ft 3in long forged steel seamless steam receiver for one of the latest B.E.A. stations showing examples of branch welding and reinforcing.

Aladdin Industries, Ltd., Greenford, Middlesex. **A.428.**—Portable radiators.

William Allday & Co., Ltd., Alcosa Works, Stourport. **D.505.**—With its subsidiary, A. H. Wilkes & Co., Ltd., the company shows electric soldering irons, motor fan sets for blacksmiths' use, high-pressure fans and motorized positive pressure blowers.

Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, 9. **D.630.**—Permanent magnets, castings and small tools.

Almin, Ltd., Farnham Royal, Bucks. **B.723.**—An advisory bureau answers queries regarding the uses of aluminium alloys.

Aluminium Industries, Ltd., Lion Works, Engine Lane, Lye, Worcs. **A.506.**—"Lion Brand" domestic hollow-ware.

Anglow Electric, 241-243, Heigham Street, Norwich. **C.223.**—Among fires, heaters, kettles, breakfast cookers, etc., two new lines are hot cupboards and a 1½-gall. water heater incorporating medicine cabinet and shaving mirror.

Auto Diesels, Ltd., Uxbridge. **B. Outdoor.**—Generating plants of from 500W to 100kW capacity include fully automatic domestic units. Electrically driven self-priming pumps are available in 1½in, 2in, 3in and 4in sizes.

Auto-Lec Engineering Co., Ltd., Chandos Pole Street, Derby. **A.327-226.**—Electric potato peeling machines incorporate re-

placeable non-corrosive metal abrasive liners.

W. & T. Avery, Ltd., Soho Foundry, Birmingham. **D.523/420.**—Besides scales and counting scales, this company shows a 50-ton self-indicating universal testing machine, a 100-ton hydraulic compression testing machine, hardness and impact testing machines.

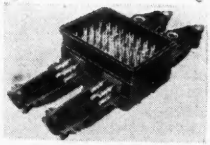
Babcock & Wilcox, Ltd., Farringdon St., London, E.C.4. **D.407/306.**—On a stand which takes the form of the firing aisle of a modern central power station boiler-house equipment of all kinds includes water-tube boilers, pulverized fuel firing equipment, automatic stokers, coal and ash-handling plant, and electric cranes.

Bakelite, Ltd., 18, Grosvenor Gardens, London, S.W.1. **C.404.**—The extent to which the electrical industry relies on "Bakelite" plastics is demonstrated by such articles as telephone instruments, stud welding guns (illus.) and radio coil packs. It is also shown how "Bakelite" materials, properly employed, can increase output and frequently improve the product. Applications

Crompton Parkinson stud welding gun made of "Bakelite"

of "Bakelite" resins range from cement for electric lamps to electrical insulating varnishes. "Vybak" cable covering compounds do not attack the copper conductors, are unaffected by chemicals and water and do not perish.

H. J. Baldwin & Co., Ltd., 605, Mansfield Road, Nottingham. **C. 210.**—A new patent sealing device is fitted to all cable boxes shown (illus.), while feeder and distribution pillars have a new type of door with a novel hinge permitting an opening of 180 deg and giving a complete weather seal. The company is world distributor for the heating elements, spirals and micas by its associate, Wireohms, Ltd.



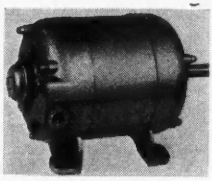
"CD" underground link disconnecting box (H. J. Baldwin and Co.)

"Bank" Hardware Manufacturing Co., Ltd., Whittimere Street, Walsall. **A.325.**—Adjustable reflector type fires, irons and toasters.

Barford (Agricultural), Ltd., Grantham. **A.307.**—Electric sterilizers and boilers are among this company's products for dairies.

Barlow-Whitney, Ltd., Coombe Rd., London, N.W.10. **C.115.** — Electrically heated industrial equipment includes furnaces, ovens, wax and compound kettles, impregnating plants, glue and solder pots, lead and babbitt pots, air heaters, etc.

Barries Electrical Agencies, Ltd., King Street, Brighton, 1. **C.302.**—A special display made of the new "Barlecta" industrial low horsepower motors (illus.) available in a wide range of types from ¼ to 3 h.p. The company's new 15 A double pole and single pole and neutral fuse boards, 2- to 12-ways, can also be seen, together with cables, flexibles, etc.



Barries "Barlecta" motor

James Barwell, Ltd., 40, Great Hampton Street, Birmingham, 18. **B. 521.**—The company's subsidiary Barbells, Ltd., manufactures many type of bells and gongs.

Bastian & Allen, Ltd., 11, Bedford Square, London, W.C.1. **C.710.**—Among electrode steam boilers and hot-water boilers the smallest unit is shown working The company's new proportionate load controller automatically varies the electrical input in accordance with the steam pressure so that the load is constantly varying to meet the steam demand. A small model (200 W) of the low-frequency induction heater with energy controller is suitable for heating small press tools up to 400 deg F. With a standard electric storage water heater are various immersion-heater elements.

B.B. Chemical Co., Ltd., Ulverscroft Rd., Leicester. **D.117.**—"Bostik" industrial adhesives and sealing compounds.

Belling & Co., Ltd., Southbury Road, Enfield. **C.515.**—Electric cookers incorporate automatic temperature control,

Belling plate and dish warmer

inner glass oven doors and automatically illuminated ovens. Fires of both modern and period design are shown, together with breakfast cookers, boiling rings, a new plate warmer (illus.) and a drying cabinet.

Belling & Lee, Ltd., Cambridge Arterial Road, Enfield. **C.712.**—Television aerials, anti-interference aerials, "Skyrod" and "Eliminoise" transformers, communal amplifiers, interference suppressors, thermal and overload cut-outs, thermal delay switches, blanket thermostats, etc.

James Beresford & Son, Ltd., Kitts Green Works, Mackadown Lane, Marston Green, Birmingham. **C.108.**—Submersible deep well pumps, centrifugal self-priming pumps and multi-stage boiler feed pumps.

Lewis Berger & Sons, Ltd., 35, Berkeley Square, London, W.1. **B.619/518.**—Insulating materials and special finishes.

Berry's Electric, Ltd., 86, Newman Street, London, W.1. **C.229.**—A new departure in "Haloberry" illuminated radiators, the "Rayvector" combines the direct radiation of two 1 kW elements in reflector pans with the convected heat from a 750 W convector. Among "Magicoal" fires in period and modern settings are the latest model, the "Masterberry," and the "Adjustaberry" telescopic log fire. Lighting fittings include new designs in glass, oak, wrought iron, brass, fabric and cast stone. The "Fuelec" storage tank can be used either in conjunction with a solid fuel boiler or as an independent water heater. New "Viking" industrial fuse-switches and a switchboard complete the display.

F. H. Biddle, Ltd., 52, Clerkenwell Close, London, E.C.1. **B.326.**—"Vectair" extended surface coils for air-conditioning, etc.; propeller fans; "Vectair" convectors; "Univectair," "Projectaire" and "Torridaire" electric heaters, and pumps.

B.I.F. Engg. Co. (1940), Ltd., 212, Aston Rd., Birmingham. **A.622.**—Air compressor sets, spray pistols, valves, etc.

B.I.P. Tools, Ltd., Tyburn Road, Birmingham, 24. **C.610.**—A new development, the fitting of induction heating coils in plastic moulding tools, gives quicker heating up, improved temperature control and greater reliability.

Birkbys, Ltd., Liversedge. **C.307.**—Electrical mouldings in "Elo" materials are accompanied by moulding powders; resins for bonding, laminating and impregnating purposes; insulating varnishes; cements and lacquers; filling compounds, etc.

Birlec, Ltd., Tyburn Road, Birmingham, 24. **D.509/406.**—A rotary-drum gas carburizing furnace for dealing with small parts in quantity is fully mechanized so that one attendant can supervise the working of a battery of such furnaces without difficulty and with complete uniformity of results. An automatic high frequency induction heating unit for surface hardening automobile gearbox shafts is in actual production. Other equipment, ranging from large steel-melting furnaces to bright annealing and other copper brazing gear is represented by models, photographs and typical products.

Birmingham Battery & Metal Co., Ltd., Birmingham, 29. **D.514.**—Tubes, plates, sheets, etc., include "Batalbra" corrosion-resistant aluminium-brass condenser tubes.

Bitulac, Ltd., Collingwood Buildings, Newcastle-upon-Tyne, 1. **B.702.**—A small infra-red stoving plant shows the whole process of dipping and stoving in various coloured paints. A new wrinkle finish stoving enamel accompanies electrical insulating compounds and varnishes.

Black & Decker, Ltd., Harmondsworth, Middlesex. **C.607.**—Portable electric drills range from a ¼in one-hand model to units up to 1¼in. Electric screwdrivers make it possible to drive as many as twelve 2in No. 10 wood screws per minute. Bench and portable grinders, 7in sanders (illus.) and "Ripsnorter" saws are also to be seen, together with a redesigned 16-gauge "Lectro-Shear" with a new shoe adding strength to the cutting part of the tool.

Black and Decker 7in flexible disc sander

Blending Machine Co., Ltd., 3, Bond Street, Birmingham, 19. **C.605.**—Wet type sifting machines with magnetic separators, a glaze circulating machine with a new type of pump, a small portable high-frequency vibratory foundry sand sifter, a new high-frequency vibratory screening machine for thimble separating in the ceramic industry, screening and magnetting equipment for cleaning dry free running powders such as silica sand.

E. W. Bliss (England), Ltd., City Road, Derby. **D.603.**—The company's power presses and feeds are widely used in the electrical industry.

Thomas Bolton & Sons, Ltd., P.O. Box No. 3, Widnes, Lancs. **D.125.**—The company has facilities for bending, sawing, drilling and tinning large copper bus-bars to customers' requirements. Besides examples of these the display includes bare wire and strip in copper, brass and bronze; trolley wire sections; "Combarloy" commutator segments; tubes and gilled tubes; rail bonds for electric traction; 2- and 3-pole equalizer bars; and tungsten carbide dies.

S. O. Bowker, Ltd., Regent Row, Birmingham, 1. **C.703.**—A number of new items are to be found among a range of "Tenby" electrical wiring accessories.

Bradley & Turton, Ltd., Caldwell Works, Kidderminster. **D.239.**—Plant for the plastics industry includes a 100-ton self-contained semi-automatic hydraulic press, a pelleting press and a 50 ton hand hydraulic press.

Bratt Colbran, Ltd., Lancelot Road, Wembley. **C.504.**—The main attraction is the "Sunrise" imitation coal fire which radiates its heat actually from glowing imitation coals. The "High Level" bathroom heater, wall panel and inset fires are new products.

Geo. Bray & Co., Ltd., Leicester Place, Leeds, 2. **C.412.**—Applications of metal clad embedded ring, strip and sheathed wire heating elements to industrial and domestic apparatus are shown. Quantity-produced small insulators made to precision limits comprise beads, bushes, washers, small terminal and resistor supports for electric cookers, immersion heaters and other domestic and industrial heating equipment. Low loss "Steatite" and standard "Steatite" are made for telecommunication apparatus insulators and a rutile body for capacitor dielectrics. Refractory supports and tube for temperatures up to 1,600 C for radio valves, cathode insulators, thermocouples and pyrometer leads are other specialities.

British Aluminium Co., Ltd., Salisbury House, London, E.C.2. **D.605.**—Aluminium and aluminium alloy plate, extruded sections, "Rigidal" corrugated aluminium sheet and coiled strip.

British Electric Transformer Co., Ltd., 95, Aldwych, London, W.C.2. **C.609.**—A 25kVA 3-phase pole-mounting transformer, a typical outdoor unit for rural supply, has been designed for service in any part of the world under the most severe lightning conditions. The range of transformers built covers all classes, including h.v. transmission units of 60MVA or more.

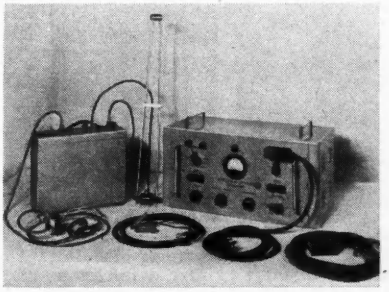
British Electrical Development Association, 2, Savoy Hill, London, W.C.2. **C.509/408.**—Besides serving as an inquiry bureau, this stand is being used to demonstrate modern applications of electricity to industry, technical staff of the Midlands Electricity Board being in attendance.

British Emulsifiers, Ltd., 12, Greek Street, London, W.1. **A.524.**—The "BEL Empire" model power driven emulsifier has an output of up to 15 g.h.p.

British Ermeto Corporation, Ltd., Hargrave Road, Maidenhead. **D.723.**—High pressure pipe couplings.

British, Foreign & Colonial Automatic Light Controlling Co., Ltd., 100, Holdenhurst Rd., Bournemouth. **C.217.**—Electric time switches, counters, process timers, clockwork switches, time lags, refrigerator control switches, automatic switches for public lighting signs and window lighting, poultry switches, etc.

British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk Street, London, W.C.2. **C.318** and **C.413/316.**—Among h.v. cables are oil filled, solid, including sandwich type, cables and a new impregnated pressure cable for 200MVA duty at 220kV. For industrial power factor correction,a working model shows the advantages of installing capacitors and a 40kVAr capacitor controlled by an air break contactor is also displayed. The "Bimec" cable fault locator (illus.) overcomes the limitations of the search coil methods which arise from re-radiation of the injected signal by adjacent metalwork. Electric resistance welding machines include both spot and butt types. Television down-lead cables are of three types—coaxial, unscreened twin and screened twin. The B.I.C.C. consumer service unit has been further developed. "E" type fuse links effectively eliminate premature blowing, leaving sub-circuit fuse links to deal with minor faults. Mining type trailing cables



B.I.C.C. "Bimec" fault locator

are protected against mechanical damage by extremely flexible conductors and tough outer covering.

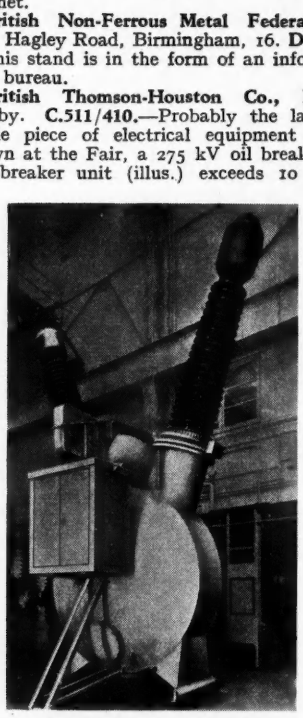
British Jeffrey-Diamond, Ltd., Wakefield. D.526.—The "Atomill" is of particular interest among breaking, crushing, pulverizing and grinding machines for from 8in cubes down to minus 300 mesh, available in capacities from a few hundredweights to hundreds of tons per hour.

British Moulded Plastics, Ltd., Walthamstow Avenue, London, E.4. **D.738.**—Moulded plastics made by this company and by Moulded Products, Ltd., are accom-

panied by a wide range of mica insulations made by Copeland & Jenkins, Ltd. The plastic mouldings include both thermosetting and thermoplastic articles. A noteworthy item is a one-piece table television cabinet.

British Non-Ferrous Metal Federation, 132, Hagley Road, Birmingham, 16. **D.219.**—This stand is in the form of an information bureau.

British Thomson-Houston Co., Ltd., Rugby. **C.511/410.**—Probably the largest single piece of electrical equipment ever shown at the Fair, a 275 kV oil break circuit-breaker unit (illus.) exceeds 10 tons



275kV B.T.H. circuit breaker

in weight, stands over 23ft high from the ground to the tops of the insulators, and has an oil tank over 10ft in diameter and 6ft in depth. The short-circuit breaking capacity is 2,500/3,500 MVA, and the total break time only 3 cycles. Gas turbine work is represented by a model of a 1,200 h.p. gas turbine-alternator for marine propulsion now being built in the B.T.H. Rugby Works. There are also models of a typical marine radar layout on board ship. "Emotrol" electronic motor control equipment demonstrated provides automatic speed variation to ±2 per cent over a wide speed-range, current limit control, acceleration at constant current and dynamic braking. Besides "Mazda" lamps and "Mazdalux" lighting equipment for the home, industry, commerce, mining and the street, other exhibits are motors of various types, industrial control gear units, a special demonstration model thrustor, stator and rotor units for machine tools, suds pumps, "Fabroil" silent gears, infra-red drying apparatus and photographs of heavy electrical plant.

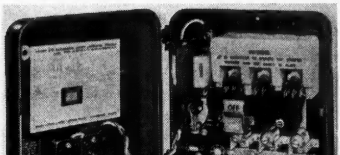
British Trane Co., Ltd., 52, Clerkenwell Close, London, E.C.1. **B.326.**—See F. H. Biddle, Ltd.

British Vacuum Cleaner & Engineering Co., Ltd., Goblin Works, Leatherhead. **A.520 and D.203/102.** — On the former stand are displayed "Goblin" labour - saving appliances, including a new low - priced washing machine with hand wringer (illus.), vacuum cleaners, heat controlled irons, clocks

"Goblin" washing machine (B.V.C.)

and the "Teasmade" automatic tea maker. Stand D.203/102 contains examples of pneumatic boiler flue dust removal plant, central vacuum-cleaning installations, portable industrial cleaners and pneumatic sack-cleaning equipment.

Brook Motors, Ltd., Empress Works, Huddersfield. **C214.**—Among a representative selection of motors and starters are "Cub" motors from $\frac{1}{8}$ to 1 h.p.; various enclosures in the 1-200 h.p. industrial range—protected, surface cooled, flameproof, etc., models; and special types such as loom, lift and saw motors. Demonstration models of sectionalized motors in operation include a unit running in water as part of a fountain unit. A new automatic push-button starter (illus.) suitable for direct starting on 15 A 440 V or 24 A 200 V, is of compact,



Incorporating plastics, diecastings and sheet steel pressings, this new Brook pushbutton starter has several unique features

modern design with on/off signal indicators. It incorporates unique ideas in construction.

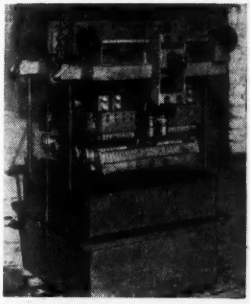
J. & F. Brooks, Ltd., 50-54, Shudehill, Manchester, 4. **A.631.**—Lighting fittings.

J. Broughton & Son (Engineers), Ltd., Vere St., Birmingham, 5. **D.610.**—Industrial safety equipment, including machine guards and protective clothing.

David Brown & Sons (Huddersfield), Ltd., Huddersfield. **D.138.**—In addition to gears, castings, etc., there is a disc testing machine for materials and lubricants and also a new universal worm gear tester. A demonstration is given of the use of X-rays in foundry inspection. A special feature is made of "Radicon" worm reducers.

Brown's Clipper Co. (1939), Ltd., Electric Avenue, Witton, Birmingham. **D.713 and D.Outdoor.**—Animal clippers.

Brush Electrical Engineering Co., Ltd., Loughborough. **C.709/608.**—A display device demonstrating the contra-rotation principle in the Brush-Ljungstrom turbine, accompanies photographs of the new range of axial-flow turbines.



Brush 3,000 A circuit breaker with oil tank lowered

Other exhibits include a standard "ONS" type salient-pole alternator arranged for belt drive with an outboard bearing; flameproof squirrel-cage blow-over and screen-protected motors; a 500 kVA 11 kV transformer core and windings; and a 5 kVA single-phase pole-mounting transformer. Prominent among flush-fronted switchgear is a three-panel board comprising a type VA5 solenoid-operated vertical isolation unit (11 kV, 250 MVA); a six-circuit type AF fuse cubicle and a 2,000 A vertical isolation truck type LT oil circuit breaker cubicle. With a model diesel-electric shunting locomotive is a selection of locomotive electrical equipment.

Bulpitt & Sons, Ltd., 132, Icknield St., Birmingham, 18. **A.417 and C.506.**—"Swan Brand" electric kettles, percolators, fires, heat-controlled irons, porringers, glue pots, urns, steamers, ground-base hollow-ware for electric cookers immersion elements, electric motors and generators.

Buncher & Haseler, Ltd., Branston St., Birmingham, 18. **A.630.**—Ground-base aluminium cooking utensils; also stampings.

Burco, Ltd., Rose Grove, Burnley. **C.312.**—The full range of electric wash boilers, together with the 217 model electrically heated hand-operated washing machine, is shown in white, cream and green synthetic enamel. A new feature of the E840 wash boiler is a spring-loaded full circular hinged lid which opens automatically at the touch of a catch. The Burco porringer can be used for cooking vegetables.

George Burn, Ltd., Rabone Lane, Smethwick. **B.309/208.**—Electrical conduit.

Cable Makers' Association, 52-54, High Holborn, London, W.C.1. **C.413/316.**—Electric cables and accessories.

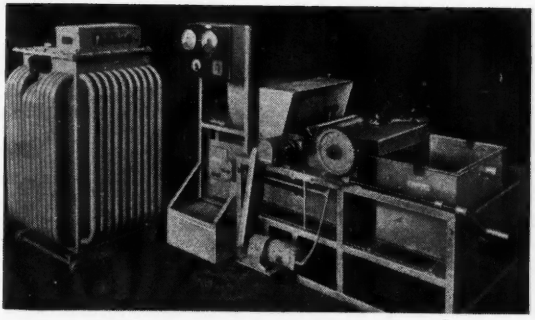
Cable & Wireless, Ltd., Electra House, Victoria Embankment, London, W.C.2. **C.104.**—The transmission and reception of radio-photos are demonstrated. The time throughout the world is shown by universal electric clocks of a new design.

Calorizing Corporation of Great Britain, Ltd., 34-36, Farringdon St., London, E.C.4. **D.407/306.**—Calorized solid pressed-steel heat treatment containers, pyrometer sheaths, air heater tubes, "Calmet" heat-resisting alloy superheater supports, etc.

Camley Engg. Co., Ltd., Camley House, Moortown, Leeds. **C.315.**—Low-temperature frozen food display and storage cabinets, domestic refrigerators, home freezer cabinets, and an automatic drink dispenser.

Campbell Engineering Co., Ltd., Sherman Works, Bromley, Kent. **A.326.**—The company's 3 kW "Hotentot" instantaneous water heater gives 1 gall at 135 deg F in 5 min or 1 pt of boiling water in 75 sec.

W. Canning & Co., Ltd., 133, Great Hampton St., Birmingham, 18. **D.207/106.**—A new motor-driven chrome plating panel



Canning chrome plating barrel

(illus.) eliminates the lengthy process of wiring up articles which are of suitable shape and size for barrelling. The container is transferred from plating tank to drag-out and vice-versa for loading and unloading by hand-operated worm and wheel. Improved motor-driven "Major" and "Minor" octagonal plating barrels for solutions other than chrome are also shown. An improved electrically heated centrifugal dryer is demonstrated, together with polishing apparatus, including automatic types. A.c. polishing motors, plating dynamos, "Canning-Westalite" rectifiers, resistance boards, and other accessories complete the display.

Capon Heaton & Co., Ltd., Hazelwell Mills, Birmingham, 30. **D.712.**—Mechanical mouldings and extrusions and bondings for the electrical industry include special extruded sections of refrigerator door seals.

Carter & Co. (Nelson), Ltd., William Street, Nelson. **C.203.**—Items of particular interest are a new fire alarm controller, sirens from ⅛ to 5 h.p., and unit heaters with indestructible "Pyrobar" heating elements loaded up to 10 kW.

C.A.V., Ltd., Warple Way, London, W.3. **C.501.**—New equipment for commercial transport vehicles, etc., includes a fuel injection pump, electrically operated door gear, a direction indicator and a dynamo.

Chloride Electrical Storage Co., Ltd., Exide Works, Clifton Junction, near Manchester. **C.417.**—Batteries for all types of vehicles, radio, torches, etc.; emergency lighting and switch tripping equipment. The guaranteed life of the "Exide-Ironclad" traction batteries is now four years.

Christy & Norris, Ltd., Chelmsford. **D.403.**—In addition to an 8in electrically operating laboratory mill there is a small model milling plant.

Clang, Ltd., Crown Yard, London, N.W.2. **C.207.**—The company's conduit fittings now include ¾in top outlet inspection elbows and various 1in fittings, while the 3-pin range of "Multiplugs" covers all possible outlets for 2 A, 5 A and 15 A. Clock connectors (double pole, fused flush and surface types) and battery holders are now available. Specially manufactured to Continental standards are the 6 A "Multiplug," the 6 A plug top and the 6 A flex connector. Conduit fittings can be threaded to suit Continental requirements.

Clarkson Thimble Tube Boiler Co., Ltd., 15, Fetter Lane, London, E.C.4. **D.407/306.**—Automatic oil-fired boiler.

George Cohen, Sons & Co., Ltd., Wood Lane, London, W.12. **D.604 and D. Outdoor.**—Cranes, presses, machine tools, woodworking machines and electric hoists.

E. K. Cole, Ltd., Ekco Works, Southend-on-Sea. **C.403.**—Although fluorescent lighting developments are emphasized, the full range of tungsten and special lamps from 15 W to 1,500 W is shown. The range of decorative filament lamps now includes 40 W candle lamps, both twisted and plain olive. Projector lamps for 16 mm film projectors and lamps for train and bus lighting have now been brought out. Fluorescent lamps in daylight, warm white and the new peach colours are accompanied by fittings. Special attention is drawn to the company's technical lighting advisory service. Among the latest "Thermovent" heating products for domestic, marine and industrial use are models specially designed for the *Caronia* and *Orcades*. The application of "Thermotubes" to church and hall heating, etc., is demonstrated.

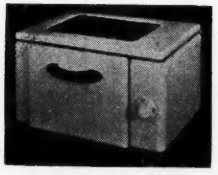
Coleman & Appleby, Ltd., Constitution Hill, Birmingham, 19. **D.211.**—New barrel plating machines and equipment include the "Hydro Verti Lift" hydraulic electric totally immersed unit, a stainless steel totally enclosed horizontal swing-over unit and the totally enclosed "General Factotum" electric drying-out barrel.

J. Collis & Sons, Ltd., 42-43, Regent Square, London, W.C.1. **D.522.**—Prominence is given to a combined "MotaVeyor" (electrically operated) and "RolaVeyor" (gravity roller) conveyor installation shown in continuous operation. The unit type "MotaVeyor" is rapidly extendable to any required length. A 5cwt electric-hydraulic stacker is demonstrated.

Connollys (Blackley), Ltd., Manchester, 9. **C.413/316.**—Cables and accessories.

Constructors, Ltd, Tyburn Rd., Birmingham, 24. **D.401/300.**—Steel factory and office equipment.

Co-operative Wholesale Society, Ltd., National Works, Hall Street, Dudley. **B.711/620.** — The "Dudley Electric" griller (illus.) incorporates an oven 11in by 10in by 7in, large enough to cook a joint. The body, hob and door are finished in white vitreous enamel. The loading is 2,000 W. A new hairdryer has a streamlined moulded shockproof body with a comfortable hand grip.



"Dudley Electric" griller (C.W.S.)

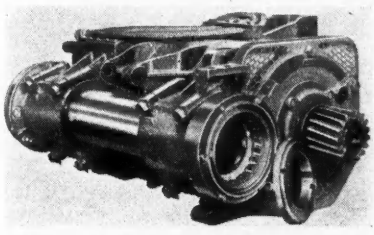
Copper Development Association, Grand Buildings, Trafalgar Square, London, W.C.2. **D.230.**—Uses of copper alloys in electrical engineering are indicated, specially in relation to railway electrification and road passenger transport.

Coventry Refrigerator Co., Ltd., Northfield Road, Coventry. **C.110.**—Refrigerator condensing units, both air and water cooled, from ⅛ to 10 h.p. are displayed, together with thermostats, expansion valves and refrigeration components.

Craigpark Electric Cable Co., Ltd., Flemington St., Springburn, Glasgow. **C.413/316.**—Electric cables and accessories.

Crane, Ltd., 45-51, Leman St., London, E.1. **B.516.**—Boilers, valves and pipe fittings.

Crompton Parkinson, Ltd., 95, Aldwych, London, W.C.2. **C.609** and **C.413/316.**—A new traction motor (illus.) designed for surface stock for the London Transport Executive, develops 110 h.p. and 17½ m.p.h. with a power input of 160 A at 575 V, and gives a high rate of acceleration and a low balancing speed. The ALA.1 switchgear unit has been developed with small dimensions, to minimize and simplify maintenance, facilitate installation and ensure safe and reliable service. It has a normal current rating of 600 A, breaking capacity, ratings available being 150 MVA at 6.6 and 11 kV and 250 MVA at 11 kV. Visitors can try for themselves the simplicity, speed and reliability of the "gun" used in the "Nelson" stud welding system. A special feature of "Young" batteries is the armoured positive plate assembly used

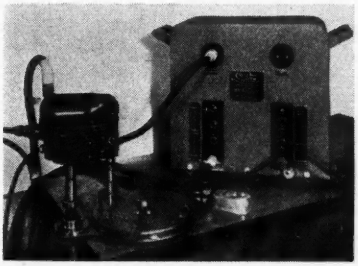


Pinion end of Crompton Parkinson LT.111 railway motor

for heavy commercial, traction and marine service. Totally enclosed ceiling fans have a specially designed motor with a capacitor winding and a condenser permanently in circuit. Besides a display of selected fluorescent lighting fittings, the illumination for the stand itself is provided by decorative and distinctive fittings for commercial premises. A new range of 6in moving-coil and moving-iron switchboard ammeters and voltmeters in moulded cases is shown, with "Tong-Test" ammeters, house service meters and portable instruments.

R. Cruickshank, Ltd., Camden Street, Birmingham, 1. **D.224.**—Automatic and manual plating barrels, rectifiers, polishing machines, the latest filter press and backstand polishing machines, from the self-contained model to the "Minor" bench type, are exhibited, together with mops, compositions and brushes. Special attention is drawn to "Efco-Udylite" bright nickel solution which eliminates polishing the nickel deposit before chromium plating.

Cyc-Arc., Ltd., 27/29, New North Road, London, N.1. **C.218.**—A self-contained stud welder (illus.) designed as a machine



Cyc-Arc electro-hydraulically actuated fixed stud welding head with controller

tool for quantity repetition work is believed to be the first apparatus of its kind ever produced. The A/20/P portable model for ¼in to ⅜in diameter studs has been specially designed for welding through paint, scale, rust and dirt. The B/20 stud-welding equipment has a range of from $\frac{5}{16}$in to ⅜in diameter studs. A new standard electro-hydraulically actuated fixed stud welding head for jigging takes $\frac{1}{16}$in to 1in diameter studs. Demonstrations are given of stud welding of aluminium and aluminium alloys.

T. H. & J. Daniels, Ltd., Lightpill Iron Works, Stroud, Glos. **D.319/216.**—A 28-ton transfer moulding press is shown moulding electrical parts. The mould is fitted to 20in-square electrically heated platens with thermostatic control.

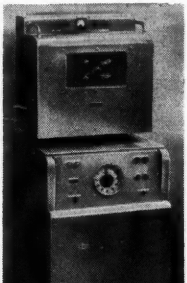
Edwin Danks & Co. (Oldbury), Ltd., Oldbury. **D.407/306.** — Boilers, stokers, piping and boilerhouse equipment.

Davis Bros. (Illuminating Engineers), Ltd., 54, Islington Park Street, London, N.1. **C.105.**—Cable trunking bends and tees, busbar chambers and adaptable boxes; stage lighting equipment; directional signs of the box and glass tablet type; l.v. spotlights in weatherproof housing; industrial-type reflectors for fluorescent and tungsten lamps.

Davis & Timmins, Ltd., Walthamstow, London, E.17. **C.309.**—Screws, nuts, washers, studding, terminals, cable sockets, connectors, conduit bushes and brass automatic machine repetition parts, together

with inserts for plastics, presswork, etc.

Delapena & Son, Ltd., Russell Place, Cheltenham. **D.234.**—The "Deltron" E 12 eddy current heater (illus.), embodying a 5 kW generator, though similar in



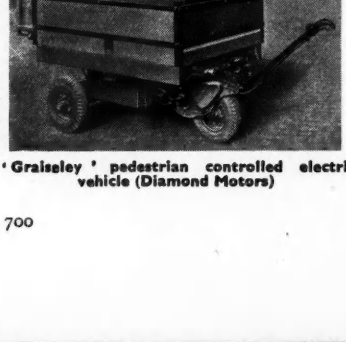
Delapena "Deltron E.10" 2 kW eddy current heater

appearance to the E 10 2 kW model, incorporates the improved cooling system adopted for the external anode type oscillator valve. A feature unique to "Deltron" appliances is the separate applicator unit. Industrial honing equipment is also demonstrated.

G. P. Dennis, Ltd., Fleming Road, Speke, Liverpool. **C.720.**—The company's attractive new "Smoke Grey" enamel finish is introduced on an l.v. sub-station distribution switchboard of the latest tail-type construction, a cubicle control panel for 150 kW alternators, medium voltage industrial switch and fusegear, consumers' control units, cooker control units and domestic fusegear.

Desoutter Brothers, Ltd., The Hyde, London, N.W.9. **C.415.**—A new range of $\frac{1}{4}$in and $\frac{5}{16}$in capacity electric drill guns have speeds from 450 to 5,000 r.p.m. Electric screw guns and nutrunners drive up to No. 12 wood screws or $\frac{5}{16}$in nuts. All screw guns can be supplied with reversing switches. Bench stands or clamps are available for all models. The larger capacity "Vidal" drills are also shown.

Dexion, Ltd., 34, Fouberts Place, London, W.1. **A Outdoor.**—"Dexion Angle" standard constructional units can be bolted together to build a wide variety of structures, including framework for electrical gear, etc.



'Graisseley' pedestrian controlled electric vehicle (Diamond Motors)

Diamond Motors (Wolverhampton), Ltd., Upper Villiers Street, Wolverhampton. **C.227.** — Accompanying industrial type "Graiseley" pedestrian-controlled electric vehicles (illus.) is a complete power unit showing the driving-motor, centrifugal clutch, reduction gear box, reversing and isolating switch, etc.

R. G. Dixon & Co., Ltd., Empire Way, Wembley. **C.728.**—Industrial floor scrubbing, polishing and carpet shampooing machines, power suction squeegees and pressure wax sprayers. The "Columbus" suction floor polisher sweeps, cleans and burnishes in one operation.

Dorman & Smith, Ltd., Ordsal Electrical Works, Manchester, 5. **C.106.**—A unit-type metal-clad switchboard incorporates a busbar chamber with "Stirling" switch fuses with rewireable and h.r.c. fuses, a 300 A triple-pole "T" type switch fuse and flush-mounted instruments. Skeleton substation gear is demonstrated by a 3-phase 4-wire one-way board. Flameproof equipment includes a Buxton certified "T" switch fuse and a "Dioprism" lighting fitting. A 200 A totally enclosed triple pole and neutral circuit breaker has magnetic blow-outs, time lags, and special coils. The "Diolux" bulkhead lighting fitting can be seen in its new die-cast case. Industrial floodlights, "Ordsal" handlamps, new 30 A and 60 A short-break switches, a floating contact fuseboard, test prods and a h.r.c. consumer distribution unit are also on view. DS Plugs, Ltd., exhibit their fused plug and socket range, ring main system, a new 3-way fully fused and shuttered adaptor and cooker control units. Rotary switches (25 A) are displayed by British Klockner Switchgear, Ltd., together with snap-action change-over limit switches, sliding contact limit switches and push-button units.

S. J. Downham & Co., Ltd., Stone Court Works, Pembury, Kent. **B.505.**—New type of illuminated bathroom cabinets.

D. P. Battery Co., Ltd., Bakewell.—**C.711.**—Batteries for lighting plants, power stations, telephone exchanges, etc., from 10 to 73,000 Ah capacity; "Kathanode" traction batteries for electric trucks, vehicles, locomotives, ships and submarines.

DS Plugs, Ltd., Ordsal Electrical Works, Manchester, 5. **C.106.**—See Dorman & Smith, Ltd.

Dunlop Rubber Co., Ltd., Cambridge St., Manchester, 1. **D.519.**—Rubber goods for industry include conveyor belting, V-belts, rollers, ebonite and anti-corrosion rubber.

Dunlop Special Products, Ltd., Fort Dunlop, Erdington, Birmingham. **D.220.**—Among working models shown by the Engineering Components Division is one using

cathode ray oscilloscope equipment, to demonstrate anti-vibration mountings for instruments and machinery.

Duralite, Ltd., 25, Manchester Sq., London, W.1. **C.403.**—Fluorescent lamps.

Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2. **C.413/316.**—Electric cables and accessories.

F. J. Edwards, Ltd., 359-361, Euston Road, London, N.W.1. **D.411.**—Among machines and tools for the sheet metal working industry are three new items, the "Besco" N 1A open-fronted vertical section bending rolls, a 36-ton production press brake and a multiple turret punch.

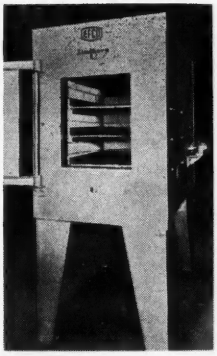
Ega Electric, Ltd., Holyhead Road, Wednesbury. **C.107.**—A paint spraying gun weighing 3lb incorporates a centrifuge and needs neither air compressor nor fan. "Egatube" non-metallic tubing looks like steel conduit, but is one-seventh the weight, is easier to manipulate and will not rust. In new plug-in motor control and switchgear the electrical mechanism is attached to the lid and can be detached and replaced within 15 sec. Visitors can themselves operate an automatic device developed for the rapid testing of motor control gear, switchgear, electrical appliances, etc.

Ekco-Ensign Electric, Ltd., Southend-on-Sea. **C.403.**—See E. K. Cole, Ltd.

Electric Construction Co., Ltd., Bushbury Engineering Works, Wolverhampton. **C.708.**—Special attention is drawn to an example of the "Varispeed" drive from a.c. mains, screen-protected motors, ammeters and voltmeters for mounting on switchboards or starting switches, motor starters, heavy industrial type combined switches and fuses (30A and 60A), a 120A oil-immersed circuit-breaker and one of the latest 500A low-voltage metal rectifiers for plating.

Electric Furnace Co., Ltd, Netherby, Queens Road, Weybridge. **C.611.**—The "Efco-Tocco" industrial hardening equipment employs a new radio frequency induction heating generator embodying silica envelope valves. The apparatus is shown coupled to a progressive hardening station for lawn-mower blades and is suitable also for such articles as rocker shafts, small camshafts, etc. The progressive fixture is driven by a d.c. motor with an electronic controller.

Electric Resistance Furnace Co., Ltd., Netherby, Queens Road, Weybridge. **C.611.**—The Efco-Lindberg box type cyclone furnace shown (illus.), though designed primarily for toolroom tempering, may be used for all low temperature operations up to 700° C. The Lindberg cyclone forced convection principle of heating and recirculating the air ensures a rapid, uniform transfer of heat to the work. This type of furnace is available in a wide range of sizes, and in two temperature ranges up to 850/1,300°



"Efco-Lindberg" box type cyclone furnace

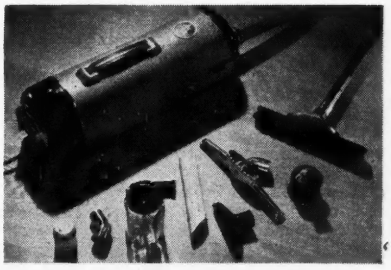
F. Molybdenum wound high temperature sintering units using a hydrogen atmosphere for temperatures up to 1,700° C are built in sizes from 1in to 5in diameter tubes; rectangular tube furnaces are also supplied. The wide variety of work handled by the company's furnaces is demonstrated by samples.

Electrical Review, Dorset House, Stamford Street, London, S.E.1. **C.614.**—Representatives are available to give technical and trade information.

Electro-Chemical Engineering Co., Ltd., Netherby, Queens Road, Weybridge. **C.611.**—A continuous plating barrel comprises a hollow drum through which small articles such as screws, nuts and washers are automatically conveyed by an internal screw thread. The drum is of rubber, cathode contacts being provided to which current is passed through a slip-ring and brush gear. Internal anodes are incorporated. The average output when zinc plating is 200lb per hour. Articles plated by the "Efco-Udylite" bright nickel process can be seen.

Electro-Hydraulics, Ltd., Liverpool Road, Warrington. **D717/616** and **D.Outdoor.**—This company makes battery driven "Conveyancer" fork lift trucks.

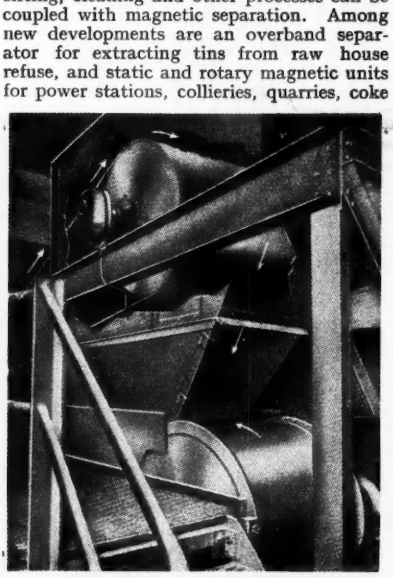
Electrolux, Ltd., 153-5, Regent Street, London, W.1. **C.736.**—Improved fan and motor design give the new model Z 55



Electrolux Z55 vacuum cleaner

vacuum cleaner (illus.) a remarkably high suction power. Ease of manipulation is enhanced by the introduction of the rotating end piece and an improved flexible hose. The latest absorption type refrigerator L K 450 of 4.6 cu. ft capacity is shown.

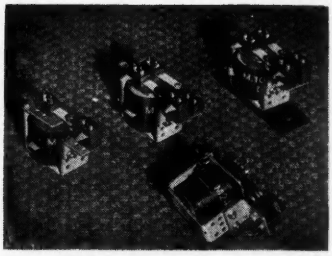
Electromagnets, Ltd., Bond Street, Birmingham, 19. **C.605.**—Lifting magnets, magnetic extractors (illus.), magnetic clutches, hold-down magnets and chucks are widely used in industry. Manufacturing facilities are now available for producing self-contained plants in conjunction with the associated Blending Machine Co., Ltd., where blending, mixing, sifting, cleaning and other processes can be coupled with magnetic separation. Among new developments are an overband separator for extracting tins from raw house refuse, and static and rotary magnetic units for power stations, collieries, quarries, coke



Twin electromagnetic equipment for removing tramp iron from coal (Electromagnets)

oven plants, etc. A chute for mining work is demonstrated, together with new electrical and permanent magnet devices.

Electro Methods, Ltd., 112, Brent Street, London, N.W.4. **C.732.**—New items are a magnetic amplifier, process timers, reflux ratio head electro pulsing mechanism, a traffic counter, h.v. and l.v. surge divertors, "XE" relays (illus.), high range contact and fixed type thermometers, balancing resistors, a time-delay staircase switch, a midget relay, the "Paxette" constructor kit for making many relay combinations, the "Seddon" individual earth protection unit and a split-phase motor-starting relay. Servo motors, "Manostats" (infinitely variable automatic pressure controls), an



Electro Methods XE relays

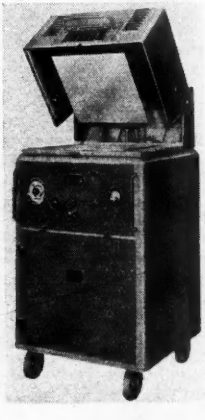
automatic water still, potentiometers, mercury switches, thermostats and silicone sleeving are other products.

Elfson, Ltd., Upper Holland Road, Sutton Coldfield. **A.609.**—Products of special interest are a combined electric fire, firescreen and occasional table; a cabinet wringer with electric dryer; and pie moulding machines.

Elliott Brothers (London), Ltd., Century Works, London, S.E.13. **D.503.**—Five flush-type panels contain a new potentiometer recorder with magnetic invertor; a new 3-term pneumatic controller; indicating and recording flowmeters; measuring instruments, including kVA and frequency recorders; CO_2 and $CO+H_2$ indicators and 6-point recorder; relative humidity and temperature indicators. Remote indication and control apparatus is demonstrated, as well as the application of magnetic amplifiers to the photo-electric counter, automatic lighting controller for street lighting systems, thermo-couple amplifier and a servo amplifier. A portable dynamometer recording voltmeter has a multi-speed clock.

E.M.B. Co., Ltd., Moor Street, West Bromwich. **D.134.** — Injection moulding and diecasting machines; a steel case air break reversing controller; rustless grid type resistances; and a crane protective panel.

E.M.I. Factories, Ltd., Hayes, Middlesex. **C.516.**—

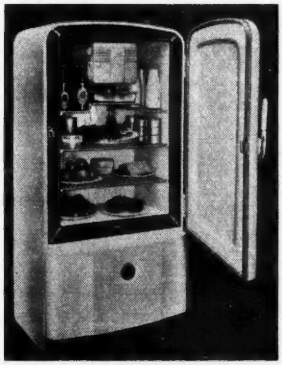


E.M.I. radio frequency heater model D 435

Working demonstrations show the great diversity of E.M.I. high frequency heating equipments (illus.), and also their numerous heating applications, including grass drying, soldering small metal parts, curing of curved wooden lamination sections and preheating plastics. A high fidelity magnetic tape recorder provides recordings of over 20 minutes duration on one reel of "Emitape."

Enfield Cables, Ltd., Victoria House, Southampton Row, London, W.C.1. **C.413/316.**—Electric cables and accessories.

English Electric Co., Ltd., Queen's House, Kingsway, London, W.C.2. **C.613/512.**—Amongst domestic appliances are the recently-introduced 6.4 cu. ft domestic refrigerator (illus.) and a range of new cookers comprising 2- and 3-plate models; one of the latter has an extra large oven.



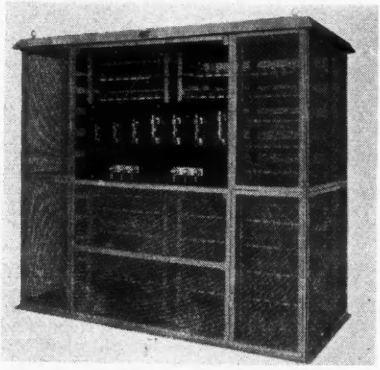
English Electric 6.4 cu ft refrigerator

All the cookers have simmer control for one of the boiling plates and thermostatic oven control, and are finished in cream vitreous enamel. A plate warmer with the element sprayed on the armour plate glass, the "Ritemp" washing machine, a 1½-gall. water heater and a circulator are also shown. A special form of motor comprising a wound stator complete with a wrapped steel shell and a cast aluminium rotor, has been specially developed for driving woodworking machinery, machine tools and combined pump units. The range of fractional-h.p. motors has recently been completely redesigned, lightness and small size having been achieved by the use of alloy castings. Switchgear and fuse production are both well represented. A typical mercury arc rectifier of the pumpless, air cooled, steel tank type is a six anode device, having an output rating of 600 kW at 17 kV. House-service type meters conform to the standard case dimensions for fixing centres and terminal centres, so they can be used in standard service units. The UVS prepayment meter is suitable for dual coin operation and is convertible to accommodate a two-part tariff collector. Indicating instruments for industrial or laboratory use include portable moving-iron and moving-coil commercial grade instruments in moulded insulated cases.

English Numbering Machines, Ltd., Queensway, Enfield. **D.539.** — Electrical counting devices and automatic numbering machines.

Ether, Ltd., Tyburn Road, Birmingham, 24. **C.700.**—In the Ether-Wheelco "Capacitrol" and "Multronic" indicating controllers seen controlling gas, oil, and electric furnaces, etc., an electronic control circuit gives instantaneous response to changes of temperature. The "Flame-otrol" combustion safeguard also demonstrated eliminates the explosion hazard when lighting up. The "Wide-Strip" potentiometer recorder is shown both as an electronically operated instrument for high speed work, and as a mechanically operated instrument for normal speeds above 45 sec. across the chart. The "Indicorder" continuous chart recording instrument is also seen in several forms, the most novel being as a pH recorder and controller. New solenoid and motor operated valves appear. A special instrument for measuring temperatures of molten metal up to 1,600° C is among pyrometers shown.

Expanded Metal Co., Ltd., Burwood House, Caxton Street, London, S.W.1. **C.617.**—Among unbreakable electrical resistances for road and rail traction, steelworks and general industrial applications special attention is drawn to a test loading resistance (illus.) of which many have been made recently in sizes up to 26,000 h.p.



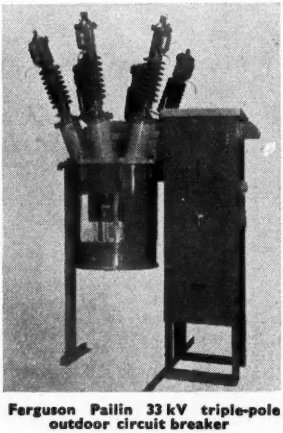
Expanded Metal test loading resistance

Air heaters and coloured anodized expanded aluminium are also included in the display.

Falk Stadelmann & Co., Ltd., 91, Farringdon Road, London, E.C.1. **C.208.**—The "Raydex Auto-Perc" automatic coffee-maker (illus.) stops percolation when the coffee is ready and keeps it hot until it is required. Trouble-free service, an easily kept-clean body and a modern appearance are features of the 4-pint 1,500 W "Cleanline" kettle with self-resetting safety device. The "Derwent" domestic or small commercial fluorescent lighting fitting employing two 2ft 40 W lamps has brightly coloured raised bands on a translucent white opal "Perspex" dish.

Falk Stadelmann "Auto-Perc" coffee maker

Ferguson, Pailin, Ltd., Manchester, 11. **C.322.**—A 33 kV, 1,000 MVA duplicate busbar metalclad indoor switch unit, a 33 kV triple-pole outdoor oil circuit breaker equipment (illus.), a 6.6 or 11 kV, 150 MVA air-insulated metalclad switch unit and a 440 V, 1,200 A, 25 MVA oil circuit breaker equipment are shown, with auxiliary products.



Ferguson Pailin 33 kV triple-pole outdoor circuit breaker

Ferranti, Ltd., Hollinwood, Lancs. **C.615/514.**—Transformers, voltage regulators, h.v. testing equipment, power factor correction condensers, a.c. and d.c. meters, measuring instruments, electronic equipments, electric fires, convectors, clocks and water heaters.

Ferro Enamels, Ltd., Wombourn, Wolverhampton. **B.515.** — Samples of raw materials, enamels and finished components.

Fescol, Ltd., North Road, London, N.7. **D.742.**—The protection of turbine blades against corrosion is carried out on a large scale by the company and specimen blades treated by the Fescol process are shown, together with crankshafts restored to size after wear.

Fibreglass, Ltd., Ravenhead, St. Helens, Lancs. **B.200.**—Five looms are seen producing "Fibreglass" tape for electrical insulation, while photographs indicate electrical applications. An acoustic chamber demonstrates the sound-proofing qualities of the material, its thermal insulating properties being shown by various other exhibits.

Finney Presses, Ltd., 27-31, Berkley Street, Birmingham, 1. **D.243.**—Products exhibited range from a 200-ton hobbing press to 10-ton laboratory units.

Firth-Vickers Stainless Steels, Ltd., Sheffield, 9. **D.419/320.**—Firth-Vickers "Staybrite," stainless and heat-resisting steels in sheet, strip, bar, castings and forgings.

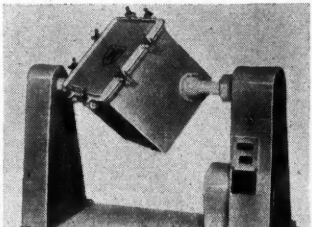
H. Fisher (Oldham), Ltd., Glodwick Road, Oldham. **C.706.**—The "Cleanette Electric Housemaid" peels potatoes, scours pots and pans, cleans shoes, sharpens knives, etc. New drying cabinets, washing machines, water heaters and thermostats are also shown.

Fisher & Ludlow, Ltd., Kingsbury Road, Birmingham, 24. **D.202.**—The "Bendix" automatic home laundry is demonstrated.

FitzGibbon & Murray, Ltd., The Lower Mill, Kingston Rd., Ewell. **C.105.**—Electrical accessories include switchplates, candle tubes, torpedo switches, switch lampholders, flex connectors, and pear switches.

Flextol Engg. Co., Ltd., The Green, London, W.5. **D.231.**—Portable electric flexible shaft machines for grinding, drilling, scaling, screwdriving, filing, wire brushing, levelling, polishing, etc.

Foster, Yates & Thom, Ltd., Blackburn. **D.504.**—A 250-ton plastic moulding press



Foster, Yates and Thom 2 D.P. mixer

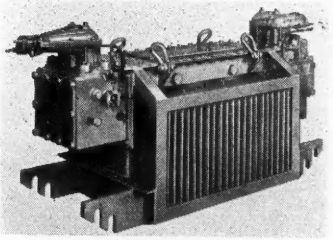
of the "Lancastrian" series is a newcomer. The No. 2 D.P. mixer has been considerably modified since last year, the laboratory size incorporating a process timing device.

W. T. French & Son, Ltd., Browning St., Birmingham, 16. **A.433.**—"Mysto" electric kettles, fires, irons, toasters, boiling rings, percolators and soldering irons.

Fusarc, Ltd., Team Valley, Gateshead-on-Tyne. **C.705.**—Typifying the company's process is the "Marine" deck welder. This comprises a welding head fitted with a power-driven carriage which moves along the complete surfaces to be welded. Normal car-type steering is fitted to the carriage so that the operator can readily follow seams or butts. Welding current can be varied by remote control. Apart from shipbuilding the equipment is suitable for such work as fabricating the floors or roofs of storage tanks, for site welding of heavy rolled-steel sections, etc.

Gascoignes (Reading), Ltd., Berkeley Av., Reading **D.175.**—Electric milking machines include the "Auto Recorder."

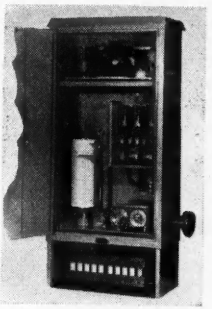
General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. **C.503/402.**—Heavy-duty flameproof equipment



G.E.C. portable mining substation

suitable for oilfields, tankers, chemical plants, collieries, etc., takes up the whole of the front half of the stand and includes oil-immersed and automatic gate-end switchgear, oil-immersed reversing contractors and a portable mining sub-station (illus.), comprising a transformer complete with flameproof h.v. isolator, l.v. circuit breaker and flit type cable boxes. Domestic appliances are represented by a kettle, toaster, coffee percolator, warming plate, a 5 cu ft refrigerator and a range of cookers including the streamlined DC 113 model with a drop-down oven door and the new DC 438E model finished in green and cream. The rear half of the stand is devoted to decorative and industrial fluorescent lighting.

Gent & Co., Ltd., Faraday Works, Leicester. **C.407.**—All the clocks throughout the Fair, including a large tower clock, are operated from a master clock in this exhibit. A new fire alarm system is demonstrated, together with marine and watchmen's tell-tale clock systems, fire alarm



Gent audible liquid level indicating recording equipment

apparatus, certified mine signalling equipment, luminous call systems, an audible liquid level indicator recorder unit (illus.) for checking levels at remote reservoirs by G.P.O. telephone, bells and indicators. Other products represented include industrial process timers; electro-motor sirens; telegraphs for industrial, domestic and mining duties; and synchronous electric clocks.

Edward Gill, 52,54, Hylton Street, Birmingham, 18. **A.648.**—A portable domestic electrical combined toaster, heater and boiling ring is among this firm's products.

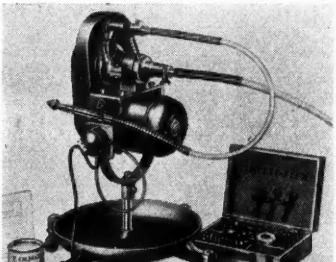
Gillott Electro-Steam Cookers, Ltd., Cotswold Works, Chalford, near Stroud, Glos. **A.318.**—Electro-steam cookers, available in both "de luxe" and "housing" models, besides providing electric cooking in the normal way also give steam for cooking in the wells, boiling water for tea, coffee, etc. (2-3 pints every 3-4 minutes) and hot water all over the house. The Gillott immersion heaters have replaceable elements which can be removed for inspection without running off the water. The new single stream boiler for cafés, etc., supplies 2-5 pints of boiling water per minute. Special features of a new electric kettle (illus.) are that the steam can come out

Gillott kettle

only at the front and that the lid will not fall off when pouring. The kettle element and trip device can be supplied separately.

F. Gilman (B.S.T.), Ltd., 195, High Street, Smethwick, 41. **D.506.**—In addition to "Skatoskalo" machines for scaling boiler tubes, etc., and for surface scaling and rust removing, "Multiflex" machines (illus.) are exhibited, together with rotary working heads for grinding, drilling, wire brushing, sanding, polishing

and other uses. "Titegrip" rotary milling cutters and flexible shafting for every

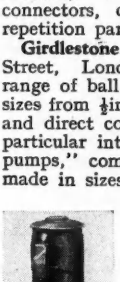


Gilman "Multiflex" 4-speed machine for grinding, drilling, etc.

kind of operation are also represented.

D. Gilson & Co., Ltd., Billet Road, London, E.17. **C.110.**—Cable sockets, connectors, conduit bushes and electrical repetition parts.

Girdlestone Pumps, Ltd., 23, Davies Street, London, W.1. **D.333.**—A full range of ball bearing centrifugal pumps in sizes from ½in to 5in are shown bare shaft and direct coupled to electric motors. Of particular interest are centrifugal "Motor-pumps," combined pump and motor units made in sizes from ¾in to 5in, and a new



Girdlestone vertical spindle pump with automatic float control

vertical spindle pump (illus.) with automatic float control for sump duties and water lubricated bottom bearing. Small electrically operated diaphragm pumps for dealing with acids and corrosive liquids can also be seen; also float switches.

Gittings & Hills, Ltd., Salford St., Birmingham, 6. **B.324.**—Among industrial finishes are synthetic stoving enamels, cellulose lacquers and oil-resisting enamels.

W. T. Glover & Co., Ltd., Manchester, 17. **C.413/316.**—Electric cables and accessories.

E. Green & Son, Ltd., Wakefield. **B.504.**—Economizers and air heaters.

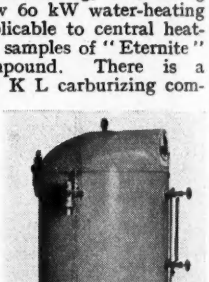
Greengate & Irwell Rubber Co., Ltd., Greengate Works, Manchester, 3. **C.413/316.**—Electric wires, cables and accessories.

Guest Keen & Nettlefolds (Midlands), Ltd., Heath Street, Birmingham, 18. **B.627/526 and B outdoor.**—Stampings are made for stators, rotors and other electrical equipment. Screws, bolts and nuts include self-tapping and recessed head screws. Hinges, hank rivet bushes, hot and cold rolled strip, forgings, wheels, industrial racking, office equipment, telegraph ironwork and 50-h.p. double drum enclosed gear haulages are other products.

Guests Brass Stampings Co., Birmingham, 29. **D.732.**—See Birmingham Battery & Metal Co., Ltd.

G.W.B. Electric Furnaces, Ltd., Dibdale Works, Dudley. **C.321/220.** — Besides 30 kW and 70 kW "Autolec" continuous electrode steam raisers there are a 2 kW steam storage unit (illus.) which, operating overnight, provides a small amount of steam for process or sterilizing, etc., during the day; and a new 60 kW water-heating boiler, specially applicable to central heating. There are also samples of "Eternite" case-hardening compound. There is a working model of a K L carburizing com-

G.W.B. 2 kW steam storage unit



pound controller. Photographs show furnace installations in all trades.

Hague & Mackenzie, Ltd., Sloane St., Birmingham, 1. **D.502.**—"Pyramid" aluminium utensils for hotplate cooking include heavy-duty vessels for hotels, etc., with reinforced sides and welded handles.

Hailwood & Ackroyd, Ltd., Morley, Yorks. **C.602.**—New items are fittings designed for schools and hand-painted glass shades.

Hale & Hale (Tipton), Ltd., Dudley Port, Tipton. **D.609/508.**—Cable brackets and similar fittings cast in malleable iron for railway electrification schemes, etc.

Hancock & Co. (Engineers), Ltd., Progress Way, Croydon. **D.739/638.**—Oxygen profiling machines have tracer heads incorporating five different forms of drive requiring wood, metal or strip templates, or for working direct from drawings.

G. A. Harvey & Co. (London), Ltd., Greenwich Metal Works, London, S.E.7.

B.329.—Fabricated steel plate, perforated metals, woven wire cloth and gilled tubes are some of the "Harco" products.

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, London, W.C.2. **C.723.**—The new 10½ pt "Hawkins-Universal" pressure cooker has been developed for use on solid hotplates. The new "LGH 1000 Electric Hostess" food server which replaces the original LGH 900, is more streamlined, more efficient and lighter in construction. A new sideboard model, LGH 1100, is available for the smaller household requirements. Among the latest fans is the 12½in oscillating model for wall or table. "Hawkins Supreme" hairdryers are now produced in cream finish. The first post-war "Tecal" automatic tea-making equipment can also be seen, together with "Klampshayd" lampshades which can be packed flat. Completing the display are the "Hawkins-Universal" heat controlled iron, kettles, gluepots, "Peter-the-Heater" (car and cupboard heater), desk lamps, a battery hand lamp and immersion heaters.

W. T. Henley's Telegraph Works Co., Ltd., 51-53, Hatton Gdn., London, E.C.1. **C.413/316.**—Electric cables and accessories.

Alfred Herbert, Ltd., Coventry. **D.310 and D.319/216.**—A wide selection of measuring instruments is demonstrated on stand D.310 from a range of Sigma, Hilger, Watts and other makes for which the company is agent. Of special interest is the Sigma automatic multi-dimension machine which will check simultaneously up to twelve dimensions at rates up to 4,000 components an hour. A new Herbert electrically operated 3-jaw chuck is also demonstrated. On stands D.319/216 are Reed-Prentice and Edgwick injection moulding and diecasting machines, a Daniels 125-ton transfer moulding press, preheaters, bale-out furnaces, air compressors, and a thermoplastic mould temperature controller.

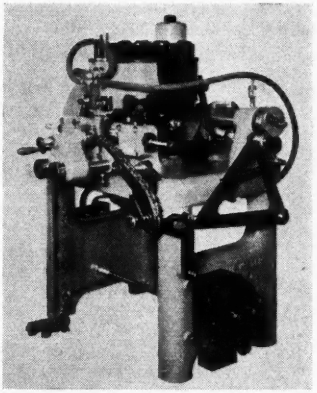
Higgs Motors, Ltd., Birmingham, 6. **C.601.**—Electric motors and generators are manufactured for a.c. and d.c. from fractional to 500 h.p. Fractional h.p. units include split phase, capacitor start and repulsion induction types. Industrial motors of the slip-ring and squirrel-cage screen protected and totally enclosed fan-cooled types are suitable for all industrial purposes. For machine tool application motors of the flange mounting pattern are built with standard flanges and shafts or special flanges and shafts to suit customers' requirements; alternatively built-in stator rotor units are available ranging from ¼ h.p. to 25 h.p. A.c. variable speed commutator motors are eminently suitable for printing, paper-making and hosiery machinery, etc. Other exhibits are polishing motors, propeller fans and small tools.

High Duty Alloys, Ltd., Slough. **D.232.**—Typical products in "Hiduminium," "Magnumium" and other aluminium and magnesium alloys.

Hilger & Watts, Ltd., 98, St. Pancras Way, London, N.W.1. **D.310.**—Optical measuring instruments for checking gauges, taps and other precision work.

Hind-Griffiths Furnaces, Ltd., Rolfe St., Smethwick. **C.725.**—Industrial electric furnaces, including kilns for the ceramic industry.

Holden & Hunt, Ltd., Cox's Lane, Old Hill, Staffs. **C.719/618.**—Spot welding



Holden & Hunt chain welding machine

apparatus comprises standard foot-operated types of 5, 10, 15, 25 and 40 kVA ratings, a 15/30 kVA model developed for welding aluminium up to ¼in. added thickness, and a power driven automatic machine with four-speed motor to give single spotting and continuous welding or stitch welding. Butt welders have been developed for welding of aluminium alloys from 16 gauge to ⅝in diameter. Two rivet heating machines are demonstrated, as well as a plant for making electrically welded chain (illus.).

Hoover, Ltd., Greenford, Middlesex. **C.716.**—F.h.p. motors include split phase, capacitor start and 3-phase motors in sizes ranging from ⅛ to ½ h.p., with a special range for refrigeration applications. The company also exhibits its electric washing machine.

E. C. Hopkins, Ltd., Grosvenor Street West, Birmingham, 16. **D.741.**—This company's products range from flexible shaft machines, bench tool grinders and polishing machines to capstans.

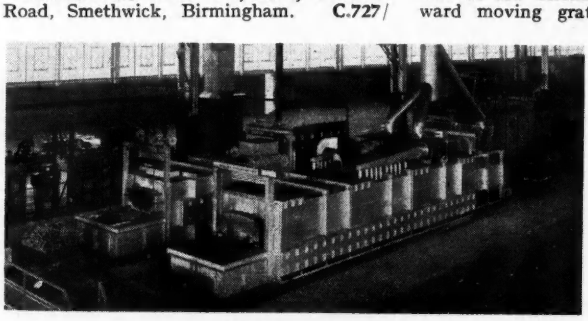
Hotpoint Electric Appliance Co., Ltd., Crown House, Aldwych, London, W.C.2. **C.513.**—Of particular interest is the complete service offered by the company's home laundry equipment, which includes a washing machine with electrically driven wringer and bowl emptying pump, flat plate and rotary ironers, and clothes dryer. The "Hotpoint Junior" vacuum cleaner, 3 cu ft "Coldrator" refrigerator, fires, a "Plus-Five" iron, a glass-sided "turn-over" toaster, and a clamp-on element type kettle are shown too, as well as the "Torribar" sheathed wire heating element, applications of which range from electric water heaters and boiling plates to cast-in elements for agricultural and factory use for metals, chemicals and air.

Charles Hufton & Sons, Ltd., Conybere St., Birmingham, 12. **A.324.**—Electric floor standards.

Imperial Chemical Industries, Ltd. (General Chemicals Division), Cunard Bldg., Liverpool, 3. **D.315/212.**—Degreasing agents, salt and salt bath furnaces for heat-treatment, casehardening, etc.

Imperial Chemical Industries, Ltd. (Metals Division), Kynoch Works, Witton, Birmingham. **D.409/308 and B.309/208.**—Non-ferrous alloys in plates, sheet, strip, tubes, wire, rods and extrusions.

Incandescent Heat Co., Ltd., Cornwall Road, Smethwick, Birmingham. **C.727/626.**—Four conveyors radiating from a centre office towards the corners each carry about twelve photographs of plant manufactured by companies in the group, each example being further illustrated by a scale model. Products of Metalectric Furnaces, Ltd., are well represented and include metallurgical furnaces for all industries, steel melting furnaces and h.f. induction heating equipment. A new plant likely to attract great interest embodies the Drever air-tight continuous strip annealing process. Special advantages claimed are improved quality through control of grain size; uniform physical properties and a clean bright surface; uniform heating throughout; speed of processing; low labour costs; clean operation; low maintenance and replacement costs. Plants can be supplied for outputs from 100lb to 15 tons per hour. Another new process, the "Lithanol" vapour carburizing system entirely eliminates boxes, compounds and consequent labour charges and obtains the required case depth in half the time required by the pack method.



Metalectric" installation for the continuous heat treatment of drop forgings

India Rubber, Gutta Percha & Telegraph Works Co., Ltd., Herga House, Vincent Sq., London, S.W.1. **D.615.**—Transmission and conveyor belting, primary batteries, ebonite, etc.

Ingram, Kemp & Joyner, 209/220, Newtown Row, Birmingham, 6. **C.421.**—"Angelus" electric fires.

International Combustion, Ltd., 19, Woburn Place, London, W.C.1. **A.327/226 and D.331/228.**—A pulverized fuel adjustable corner burner built into a portion of furnace casing is a replica of many large installations for the British Electricity Authority. A boiler installation for the Rotherham power station for which the company is supplying 200,000 lb per hour boilers, spreader stoker fired with continuous ash discharge by means of a forward moving grate, is shown in model form. The application of the "Vacseal Ferloy" metal pump to hydro-ash systems for central power stations and large industrial power plants is also depicted in model form, with drag scraper equipment.

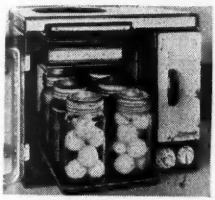
Invicta Electrodes, Ltd., Bilston Lane, Willenhall, Staffs. **D.717/616.** — Welding electrodes.

Ioco, Ltd., Netherton Works, Anniesland, Glasgow. **D.701.** — Insulating materials, including black adhesive tape.

I.T.D., Ltd., 142, Sloane Street, London, S.W.1. **D. Outdoor.**—The new "Stacatruc" battery operated truck can raise 1 ton to a height of 9 ft.

Jackson Electric Stove Co., Ltd., 143, Sloane Street, London, S.W.1. **C.411/314.**—The latest addition to the "Cleanline" cookers is the No. 69 "Giant" table cooker (illus.), which can be connected to a 13 A socket, yet will cook a meal for 4-6 persons. It incorporates a Backer-Jackson radiant boiling plate accommo-

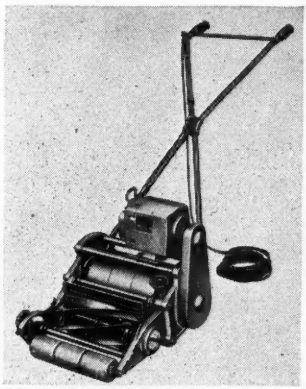
dating three saucepans simultaneously. Grilling is done in the top of the oven, a removable baffle being provided. Both oven thermostat and "Simmerstat" boiling plate controls are fitted. A plate warming compartment holds dishes and plates for six people. The "Cleanline" series is further represented by the 192J, 193J and 194J standard cabinet models.



Jackson "Giant" cooker

Heavy-duty apparatus includes the double unit chef's range to which further units can be added as required; hotcupboards of various sizes, some incorporating bains maries, sauce pots, vegetable containers, and carving wells; vegetable boiling pans; water urns; and milk and coffee urns. The Jackson twin ring boiling unit is designed for canteens, snack-bars, etc. An electrically heated food trolley has a capacity of 110 plated meals. The 10-gal washboiler is now available in an all-white heat resisting finish and with automatic cut-out and re-setting device.

J. P. Engineering Co., Ltd., Maynell Road, Leicester. **A.425.**—The new 12in electric lawnmower (illus.) is driven by a



J.P. lawnmower

$\frac{1}{4}$ h.p. motor, which like all other revolving parts is enclosed in a dustproof housing.

Jenson & Nicholson, Ltd., Jenson House, Carpenter's Road, London, E.15. **B.312.**—"Lacwatt" and "Solventless" insulating varnishes, "Jensolac" stoving enamels, "Lustrelac" polychromatic finishes, "Jensoloid" wood finishes and "Jensove" stoving blacks are among industrial, decorative and protective finishes.

Johnson, Matthey & Co., Ltd., 73-83, Hatton Garden, London, E.C.1. **D.100.**—Special sections are devoted to electrical contacts; low temperature brazing alloys; resistance welding materials; resistance wires in nickel-chromium, copper-nickel and "Minalpha" and repetition press-work materials.

Johnson & Phillips, Ltd., Victoria Way, London, S.E.7. **C.413/316.** — Electric cables and accessories.

Richard Johnson & Nephew, Ltd., Forge Lane, Manchester, 11. **B.417/318.**—Transmission wires, etc.

Kango Electric Hammers, Ltd., Lombard Road, London, S.W. 19. **D.720.**—The "E" type electric hammer, now in full production, weighs 22½lb, is 22in long and has a loading of 535 W. It delivers 1,300 blows per minute and is approximately 30 to 40 per cent more powerful than the previous largest model, the "D" type, which, together with the "C" and "S" models, is also shown.

H. Kaufmann, Ltd., 13, St. Andrew Street, London, E.C.4. **A.607/504.** — Vacuum cleaners and irons are products of this company.

Cyril Kieft & Co., Ltd., Bridgend. **A.311.**—Convector heaters, immersion heaters and electric cooker thermostats.

Geo. W. King, Ltd., Hartford Works, Hitchin, Herts. **D.404.**—Mechanical handling equipment includes the new "Marvex" electric chain pulley blocks (illus.), overhead runways and "Safelec" bus-bar system for track electrification, overhead crane and conveyor components, and "Electricar" industrial battery electric trucks.

"Marvex" chain pulley block

Lamson Engineering Co., Ltd., Hythe Road, London, N.W.10. **D.140.** — The latest automatic pre-selector type pneumatic cash and despatch tube eliminates the need for a central distributing desk and attendant to transfer carriers from one tube to another, and greatly reduces the number of tubes necessary. On this stand also are a small ventilation unit, a "Prefect" portable vacuum cleaner and a new "Monitor" industrial portable vacuum cleaner, specially designed to accommodate hose, tools and cleaning equipment. The last-mentioned machine has recently been used successfully

for collecting soot when sweeping chimneys.

Lan-Bar, Ltd., Seymour Street, Birmingham, 12. **A.525.**—Besides an electric towel rail, this company displays pressure die castings in "Mazak" zinc base alloy.

Langley Alloys, Ltd., Langley, Bucks. **D.210.**—High-conductivity alloys, corrosion-resisting materials and electrodes.

Langley London, Ltd., 72, Borough High Street, London, S.E.1. **C.226.**—Mica processed in all shapes, "Micanite" and "Langboro" laminated plastic tubes and stampings and "Langboro" mica plate form a display of components for the electrical and radio industries.

Leeds Metal Spinning Co., Ltd., 26, Leeds Bridge. Leeds. **A.523/418.**—Aluminium cooking utensils.

Legg (Industries), Ltd., Williamson Street, Wolverhampton. **C.231.**—Vehicle battery charging equipment, rectifiers, air and oil cooled transformers, battery testing accessories, etc.

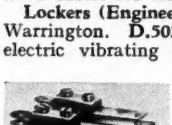
Ley's Malleable Castings Co., Ltd., Colombo street, Derby. **D.513/410.**—Strength, toughness and machinability are features of this company's malleable castings.

Linread, Ltd., Cox Street, Birmingham, 3. **D.221.**—Both Phillips recess headscrews and slotted screws are used in great quantities in many forms of electrical apparatus and the "Rivnut" has found a major application in fluorescent lighting fittings. Other Linread products are rotor and stator rivets for fractional h.p. motors, and various electrical contacts made by cold forging.

Lion Stamping Co., Ltd., 35, Marshgate Lane, London, E.15. **B.225.**—The new "Mayfair" combined radiator and convector has a 1 kW red heat element on either side with a third 1 kW black heat element inside the casing.

Liverpool Electric Cable Co., Ltd., Linacre Lane, Bootle. **C.320 and C.413/316.**—Special emphasis is placed on types of insulated cables for mining and marine work.

Lockers (Engineers), Ltd., Church Street, Warrington. **D.502.**—"Locker-Traylor" electric vibrating screens, conveyors, bin vibrators, etc.



Londex miniature relay

Londex, Ltd., 207, Anerley Road, London, S.E.20. **C.724.**—Three new relays, the "Midget" a.c., miniature (illus.), and supersensitive types, are on view, together with "Lectralevel" liquid level control apparatus, remote flow indicators, photo-electric control apparatus and signalling apparatus. Special developments are a hopper level indicator switch, an automatic sight feed lubricator, a vacuum switch and an electric turntable.

London Aluminium Co., Ltd., Westwood Road, Birmingham, 6. **A.411/312 and D.525.**—Ferrous and non-ferrous sheet metal work for the electrical industry; also aluminium hollow-ware.

London Electric Wire & Smiths, Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.320.**—A high-speed winding machine is demonstrated and there are displays of "Lewmex" synthetic enamel winding wires and round wires and strips with coverings of "Lewbestos," "Lewcoglass," cotton, silk, paper, standard enamel, etc.

Longlamps, Ltd., 24, Marshalsea Road, London, S.E.1. **C.100.**—Fluorescent, architectural and cold cathode lamps and equipment.

Joseph Lucas, Ltd., Great King Street, Birmingham, 19. **C.501.**—Electrical equipment for automobiles and for marine, agricultural and stationary engines.

Arthur Lyon & Co. (Engineers), Ltd., Telford Way, Westway Estate, London, W.3. **D.625.**—Portable electrical generating plant from 500 W to 3 kW, pumps and switchboards.

William McGeoch & Co., Ltd., 46, Coventry Road, Birmingham. **C.325.**—On this stand, which takes the form of a large model of the company's trade mark, switches, fuses, switchboards, fuseboards and accessories include a range of watertight units. Illustrations are also available of switches up to 10,000 A for telephone exchanges. Among guarded watertight lighting fittings and decorative lighting fittings are fluorescent types.

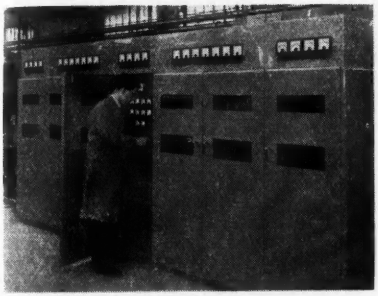
McKechnie Bros., Ltd., Rotton Park Street, Birmingham, 16. **D.612.**—A new aluminium bronze alloy, "Narrmac," developed for jet engine blades, has many other applications. Accuracy is a feature of extruded sections in brass and bronze.

Robert Maclaren & Co., Ltd., 110, Kilbirnie Street, Glasgow, C.5. **C.311.**—Various types of instruments are available for controlling temperature from 0 to 1100° C. A new snap-action switch which can be used in iron and blanket thermostats is also being incorporated in the Maclaren "Autoset" switch designed to take the place of the three-heat switch for cookers, etc. Other new developments are a refrigerator thermostat and a space heating thermostat.

Donald Macpherson & Co., Ltd., 21, Albion Street, Manchester, 1. **B.525.**—Modern synthetic paints for the protection of electrical gear can be seen under actual exposure tests.

Macrome, Ltd., Aldersley, Wolverhampton. **D.746.**—Cutting tools treated by the Macrome process to increase life.

Marconi's Wireless Telegraph Co., Ltd., Chelmsford. **C.622.** — Post-war television



Marconi 12½ kW sound transmitter for the B.B.C.'s Midland television service

equipment is shown to the general public for the first time. An "Image Orthicon" television camera with an electronic viewfinder is "shooting" scenes inside the Fair and these are shown on the 15in screen of a television monitor. A second camera outside the building televises outdoor scenes. A 12½ kW television sound transmitter for the B.B.C. Sutton Coldfield station (illus.) and a 35 kW vision transmitter for the third television station are also included.

Martindale Electric Co., Ltd., Westmorland Road, London, N.W.9. **C.734.**—New items are an industrial cleaner and the "Elevicon" for converting d.c. to a.c. and vice versa used in connection with fluorescent lighting, neon signs and power transmission. Portable blowers with suction cleaning attachments, "Commstones," commutator grinding and turning tools, mica undercutters, protective masks, arc type and percussion marking machines, portable air compressors and paint sprayers and a voltage tester are other products shown.

Matthews & Yates, Ltd., Swinton, Manchester. **D.705.** — Air-conditioning and dust-collecting equipment comprises fans, air filters and heaters.

M.C.L. and Repetition, Ltd., Pool Lane, Langley, Birmingham. **D.414.**—Precision repetition products made from the bar.

Henry Meadows, Ltd., Fallings Park, Wolverhampton. **B.Outdoor.** — Diesel, petrol, etc., self-contained semi-portable power plants from 20 to 150 b.h.p. and diesel electric alternator sets up to 60 kW.

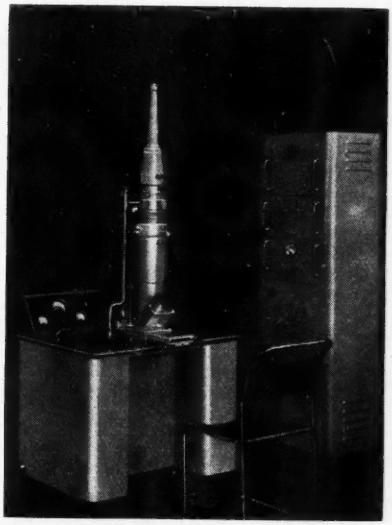
Measure-Meters Co., Ltd., "Sunnyside," Leicester Road, Salford, 7. **D.740.**—See Trumeter Co., Ltd.

Metalectric Furnaces, Ltd., Cornwall Road, Smethwick. **C.727/626.**—See Incandescent Heat Co., Ltd.

Metallisation, Ltd., Barclays Bank Chambers, Dudley. **D.326.**—Among metal-spraying plant and equipment the "Mark 16" pistol is demonstrated using aluminium, steel, zinc, etc. The automatic spraying plant installed at the company's works can handle rolled steel joists, etc., up to 50ft long.

Metropolitan Electric Cable & Construction Co., Ltd., Chadwell Heath. **C.413/316.**—Electric cables and accessories.

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, 17. **C.510.—A** "Metrolock" electronic control equipment demonstrates how the speed-ratio of a number of motors may be varied, and the selected speed ratio maintained, irrespective of load, etc., to within a fraction of 1 per cent. The new "EM3" electron microscope (illus.) has a 3-lens image-forming system, using magnetic lenses to give electronic magnification ranging from 1,000 to 100,000 diameters, with a guaranteed resolution better than 50 A.U. The "Metrovac" twin-tank high-vacuum coating plant is of special interest. The latest trolley-bus combined controller and switch group arranged for cab mounting is shown working. Special stand



"Metrovick" EM3 electron microscope

lighting has been arranged by the company's Lamp and Lighting Department.

Metway Electrical Industries, Ltd., King Street, Brighton, 1. **C.302.**—Besides heating elements, spirals, conduit fittings and wiring accessories, there is a special display of industrial lighting fittings. Attention is

also drawn to the new non-automatic and automatic immersion type kettle elements.

Midland Electricity Board, Mucklow Hill, Halesowen. **C.509/408.**—See British Electrical Development Association.

Midland Fan Co., Ltd., 212, Aston Road, Birmingham, 6. **A.622.**—Propeller, centrifugal and flameproof exhaust fans; dust extracting and fume removing plants; spray booths.

Midland Metal Spinning Co., Ltd., Tower Works, Wolverhampton. **A.513/410.** — "Tower Brand" aluminium hollow-ware for electric cooking.

Midland Repetition & Auto Mfg. Co., Ltd., Blackhorse Road, Longford, Coventry. **A.604.**—Domestic food mixing, slicing, etc., machines and aluminium hollow-ware.

Mirrlees Watson Co., Ltd., Kennerley Works, Stockport. **D.535.**—In addition to Mirrlees "Bunkerfed," hopper type and underfeed stokers there is a new unit designed for firing a kiln for burning refractories, salt-glazed pipes, tiles, etc.

Moffats, Ltd., Blackburn. **C.505.**—An all-electric planned kitchen is composed of standard cupboards and drawer units, incorporating towel dryer, removable refuse bin, etc., in addition to a double sink and electrical appliances such as cooker, refrigerator and water heater. The model 42S cooker in dapple grey and the 43S in two-tone ivory, green and ivory and French grey and white are to be seen both on legs and with step-in base. Typical of semi-heavy-duty equipment for large houses or hotels are model 294 in ivory and models E30 and E31. A Canadian type cooker is also shown. A model enamelling furnace is in operation.

Monmore Conduits, Ltd., Cable Street, Wolverhampton. **D.725.** — Welded and close joint electrical conduit in galvanized, black, silver grey and self colour finishes.

Mono Pumps, Ltd., 67, Clerkenwell Road, London, E.C.1. **D.716.**—A recent development of the positive rotary self-priming electrically driven Mono pump is the introduction of metal stators extending its application to pumping highly viscous mixtures at temperatures up to 350° F. A new 50 g.p.h. pump has been specially produced for laboratory and pharmaceutical purposes, and a new range of stainless steel pumps is being developed for dealing with edible products.

Morgan Crucible Co., Ltd., Battersea Church Road, London, S.W.11. **D.305/204.** —"Morganite" carbon brushes, carbon current collectors for cranes and trolley booms, trolley bus collector inserts, pantograph strips, potentiometers, radio and heavy-duty resistors, welding rods, etc.

Morgan Ebonite Co., Ltd., Bank Mill, Failsworth, Manchester. **D.615.**—Ebonite sheet, rod, mouldings, etc.

Morganite Resistors Ltd., Bede Trading Estate, Jarrow. **D.305/204.**—Exhibits consist of variable and fixed carbon resistors for radio, radar and electronic applications. A new potentiometer, type "A," has a die-cast rotor and spindle, ingenious double-clenched terminals and several other novel features. It is available in non-switch, s.p. or d.p. switch types. It is rated at ½ W and has a range from 1,000 ohms to 2 megohms. Special heavy duty resistors in ten sizes, are available for h.f. circuits, switchgear, traction control equipment, surge protection and gas discharge lamps. Sealed tropical type resistors are also a speciality. A new material, "Grade 8," is a semi-conductor which, decreasing in resistance value with applied potential, is suitable for many surge protection applications. A range of automobile ignition interference suppressors has been developed.

B. O. Morris, Ltd., Clay Lane, Coventry. **D.515.** — Flexible shaft machines, bench grinders, polishers, etc.

A. C. Morrison (Engineers), Ltd., Quorn, Loughborough. **A.Outdoor.**—Fully automatic petrol, paraffin or diesel engine driven a.c. generating plant in from 500 to 12,000 W capacities comes into operation immediately any load is switched on: similarly the switching off of the last load shuts down the generator.

David Moseley & Sons, Ltd., Chapelfield Works, Manchester, 12. **D.640.**—Safety and robustness are features of a rubber lamp standard available in blue and white, green and black and two shades of brown. Conveyor belting, solid sheet and insertion, roller coverings, gloves, mouldings and extrudings are other rubber products.

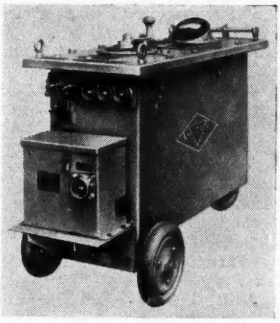
Moss Gear Co., Ltd., Chester Road, Birmingham, 24. **D.428.**—Worm and helical gear units, geared couplings, etc.

Moulded Products, Ltd., Chester Road, Birmingham, 24. **D.738.** — See British Moulded Plastics, Ltd.

Murex, Ltd., Rainham, Essex. **D.709.**—A wide range of metals, non-ferrous and ferrous alloys is produced. Applications of the "Thermit" process, used for welding and for making steel castings, are displayed, as well as aluminium-nickel-cobalt permanent magnets, produced by powder metallurgy methods.

Murex Welding Processes, Ltd., Waltham Cross. **D.709.**—Practical demonstrations are given of electric arc welding. A new safety device (illus.) automatically reduces the voltage at the electrode holder from 80 or 100V to approximately 30V within a fraction of a second of breaking the arc. Representative welding equipment includes petrol or diesel engine driven sets, transformer equipments and motor generators with either single or dual control. A new 175 A

transportable transformer equipment meets the demand for a low-input arc welding equipment for use in small engineering works, garages, and on farms. It has an output of 10.5 kVA and has a combination of switches which gives 32 settings between 15 and 175 A. A 250 A portable transformer equipment and the latest 300 A motor generator set can also be seen exhibited together with welding accessories. Electrodes now cover over 60 different types.



Murex 241 transformer fitted with new safety device

James Neill & Co. (Sheffield), Ltd., Napier Street, Sheffield, 11. **D.116.**—Permanent magnets, permanent magnet chucks and accessories, and engineers' tools are specialities of this company.

Neon Electric Co., Ltd., 24, Marshalsea Road, London, S.E.1. **C.100.**—Neon signs and cold cathode fluorescent tubes.

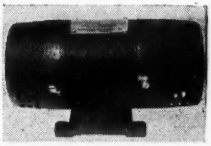
Neville's (Liverpool), Ltd., Purley Way, Croydon. **D.121.**—Coil winding machines.

Newage (Manchester), Ltd., 281-289, Bury New Road, Manchester, 7. **D.625.**—Petrol and diesel engine driven generators.

Newman Industries, Ltd., Yate, Bristol. **C.306.**—Principal interest is focused on industrial and fractional-h.p. a.c. motors (illus.), especially totally enclosed types. Industrial motors from ½ to 25 h.p. include fan cooled and double cage, high torque units. Loom and flameproof motors are also represented, together with starters.

Newman "Imp" capacitor start induction run cradle base motor

Newton Brothers (Derby), Ltd., Alfreton Road, Derby. **C.718.**—A special feature is made of "Newton-Derby" automatic carbon pile voltage regulators which are robust, quick-acting, light in weight and economical in operation, and require a minimum of servicing. Compact new rotary transformers and convertors (illus.) cover from 8 to 500 W output. Special types of motors and alternators include h.f. alternators and a spinning motor for the rayon industry. Reverse current cutouts can also be seen.



Newton Bros. rotary transformer

New Day Electrical Accessories, Ltd., 28, Queen Anne's Gate, London, S.W.1. **A.318.**—All the electrical accessories displayed have been developed since 1945 and accordingly embody standardized features and such improved technique as micro-gap switching and quick-fixing "unit" construction. Among the items seen are flush tumbler switches, a box for flush switch or socket, a neon indicator control switch, a "Twin Two" socket outlet, a press-button 3 kW switch-socket and the "Fireside" triple-socket outlet comprising a 3 kW mains socket with two 2A auxiliary sockets protected by a 5A cartridge used with a self-ejecting carrier.

Northern Aluminium Co., Ltd., Banbury. **D.629.**—The theme of this display is the company's direct products and manufacturing resources. The central feature is a half-scale model of one of the company's five hot mills, scale models of the works at Banbury, Rogerstone and Birmingham occupying one side of the stand.

Northern Rubber Co., Ltd., Victoria Works, Retford. **D.730.** — Mechanical rubber goods for the electrical industry.

Sir James Farmer Norton & Co., Ltd., Salford, 3. **D.249/144.**—The latest wire-drawing machines allow for the increased driving power required for the substantial increases in drawing speeds. The speed of each block is synchronously controlled relative to the draft and elongation of the wire, in some cases back tension being imparted to the wire.

Oldham & Son, Ltd., Denton, Manchester. **C.414.**—The Poole explosimeter for testing the liability of an atmosphere to explosion is available with a multi-point recorder and alarm system. A high-sensitivity combustimeter records the presence of slight traces of combustible gases or vapours which might be harmful to personnel. Battery manufacturing activities are represented by starter, vehicle, marine, traction and mining types. Charging equipment and industrial lamps are also exhibited.

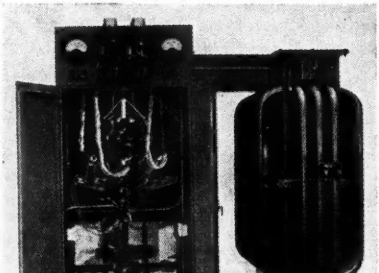
Omes, Ltd., Beverley Works, London, S.W.13. **D.533.**—Forgings made by the electro forging method.

Ormond Engg. Co., Ltd., Rosebery Avenue, London, E.C.1. **C.205.**—Electrical accessories, appliances, hairdryers, toasters, etc.

Osborn Manufacturing Co., Ltd., 5-13, Highgate Square, Birmingham, 12. **C.111.**—A three-light fitting weighs less than 1¼lb and folds up into a box measuring 6in by 6in by 16in. No fixing to the ceiling is necessary, the fitting being simply plugged into an existing lampholder socket.

Parnall (Yate), Ltd., Yate, Bristol. **C.304.**—The E.C.10 electric cooker is shown for the first time in its final form. Its special features are a distinctive bow front, a horizontal arrangement of the switch knobs, a splash plate integral with the hob, three or four circular boiling plates as desired, a 2½ cu. ft oven with broiling elements at the top and roasting elements at the bottom controlled by a single knob, a plate-warming drawer in the plinth if desired and a drop-down door with concealed hinges. The E.C.5 and E.C.6 cabinet type cookers are both available with alternative mountings—tubular steel skid legs, plain plinth or plinth with fitted drawer. The "Silver Grill" breakfast cooker has been specially designed for the small home or to supplement coal or coke ranges.

Partridge, Wilson & Co., Ltd., Evington Valley Road, Leicester. **C.305.**—The latest "Davenset" fast charger, Model "Q," replenishes lead acid batteries safely in 30-60 minutes. Other "Davenset" battery charging equipments include types for charging of standby batteries as used in power stations for switch tripping, emergency lighting systems, etc., and for dealing with alkaline cells used in miners' hand lamps. Selenium metal rectifying units for electro-plating are also displayed. Power transformers designed specially for overseas markets have low iron losses and have all the tank fittings mounted on the tank lid.



Partridge Wilson "Davenset" mercury-arc rectifier

P. B. Sillimanite Co., Ltd., Atlas Road, London, N.W.10. **C.620.**—Electrical ceramics and powders for tubular elements, furnace lining materials, etc.

Phœnix Sales, Ltd., Winton House, St. Andrew Street, London, E.C.4. **A.607/504.**—Particular attention is drawn to the "Clipper" vacuum cleaner which is proving popular in Canada, Argentina, Australia, etc. The "Major" and "Popular" machines can also be seen.

Pinchin, Johnson & Co., 15, Clifford Street, London, W.1. **B.625.**—Protective and decorative industrial coatings.

Pirelli-General Cable Works, Ltd., Southampton. **C.413/316.**—Electric cables and accessories.

Poles, Ltd., Tyburn Road, Birmingham, 24. **C.323.**—"Adastra" poles are made from steel and are hot spelter galvanized after manufacture. Standard tapering tubular sections provide a range of poles up to 15 metres in height and ultimate loads up to 1,250 kg at the top. The poles are specially suitable for street lighting standards and for supports for overhead power lines and telephone lines.

Power Centre Co., Ltd., Lloyd Street, Wednesbury. **C.606.**—Complete industrial electrical distribution equipment, includes cable trunking, busbar systems, switchboards, switch and fuse gear. An improved cable tap system is shown for the first time, also a trunking system divided into compartments with adjustable cross-over units, enabling cables to be taken from one compartment to another.

Premier Electric Heaters, Ltd., Keeley Street, Birmingham, 9. **C.206.**—Imitation coal fires in period designs made by Hystan, Ltd., which is now merged in the Premier organization, accompany the Premier range of electric kettles, irons, fires, toasters, percolators, etc.

Pressed Steel Co., Ltd., Cowley, Oxford. **C.303/204.**—Of particular interest among commercial, industrial and domestic refrigeration equipment are the new "Prestcold" churn immersion cooler, which both cools and stores milk; the CF 101 "Frezemetic" soft ice cream counter freezer; the new S 771 8 cu. ft domestic refrigerator; and the new SC 153 15 cu. ft service cabinet. Condensing units range from the ¼ h.p. air-cooled AR 25 to the 25 h.p. water-cooled model.

The CC 81 conservator can be used with an illuminated back panel for storing frozen foods, or as a cabinet only for ice cream.

Pritchett & Gold and E.P.S., Ltd., 50, Grosvenor Gardens, London, S.W.1. **C.702.**—Batteries for standby power and lighting, batteries for cars, etc., switch tripping and emergency lighting equipment.

Pyrotenax, Ltd., Hebburn - on - Tyne. **C.726.**—The full range of mineral insulated copper covered cables is accompanied by examples of wiring showing the seals, terminating arrangements and methods of bonding. Photographs illustrate the versatility of the cable and its special suitability for machine wiring.

Silas Quaker, Ltd., Crown Yard, Cricklewood, London, N.W.2. **C.207.**—Wiring accessories comprise junction boxes, plugs and sockets, ceiling roses, lampholders, connectors and multiplugs.

Radio Heaters, Ltd., Wokingham. **C.219.**—"Radyne" electronic h.f. apparatus includes plastic pre-heating ovens now claimed to be in use by more than half the plastic moulding shops in Great Britain. The mass production of welded plastic leather comb cases is being demonstrated

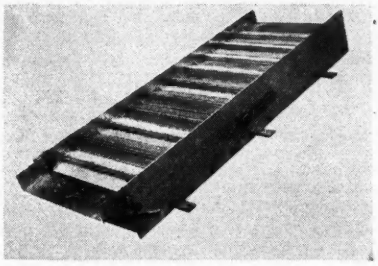
"Radyne" W6/B plastic sheet welder

on a W6/B plastic sheet welder (illus.). In addition to the C10/A 1 kW induction heating equipment, the new C50/A 5 kW induction heating generator is on display. Several large scale dielectric heating installations are in hand for such tasks as the curing of synthetic resin bonded foundry core materials and the setting of rayon yarn twist.

Ramus Tile Co., Ltd., Sumara Works, Albert Road, London, N.22. **B.204.**—Electric fireplace surrounds.

Range Boilers, Ltd., Bridge Street, Stalybridge. **B.300.**—Electric water heating apparatus.

Rapid Magnetting Machine Co., Ltd., Lombard Street, Birmingham, 12. **C.409.**—Electro-magnetic separating and lifting equipment as employed for purification, extraction, reclamation, protection, power transmission and transportation problems is shown on this stand. Electro-lifting magnets demonstrate how speedily and economically it is possible to lift and stack various materials. Of particular interest is the "O.G." magnetic mineral separator de-



Rapid electro-magnetic percolator

signed for the selective separation of feebly magnetic cores. The "Permaflux" non-electric pulley is particularly applicable to relatively shallow depths of feed. A device for work holding, the "Magnaclamp," is also demonstrated.

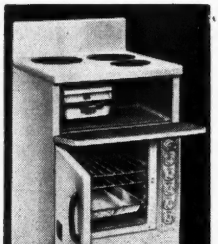
Rawlplug Co., Ltd., Cromwell Road, London, S.W.7. **C.707.**—With a bigger stand than last year the company has a more comprehensive display of fixing devices and tools, with many examples of actual fixing jobs. A new girder clip takes brackets at any angle for the carrying of cables, conduits, etc.

Record Electrical Co., Ltd., Broadheath, Altrincham. **C.722.**—A full range of switchboard instruments is now available in 4in, 6in or 8in pressed steel cases of uniform appearance and interchangeable dimensions. Examples of projecting and flush mounting instruments include the 4in and 6in flush type with square escutcheon plates. Tachometers of various types, incorporating the "Cirscale" indicator, range from 16in to 2¾in dial diameter. Among portable instruments is a change coil test set, which is self-contained for ranges up to 600 A and 750 V. The "Standard" insulation tester, redesigned in a more compact form, includes an improved generator. The "Universal" ohmmeter, with a complete range from 0.1 to 100,000 ohms, incorporates an ingenious range-change switch.

C. E. Reed & Co., Ltd., Chittening Estate, Avonmouth, Bristol. **D.702.**—A 3-ton electric hoist mounted on an electric travel trolley has a lifting speed of 15ft per minute and a standard height of lift of 15ft. The totally enclosed motor has a specially high torque short-time rating. An electro-magnetic brake sustains the load in any position when the hoist is switched off.

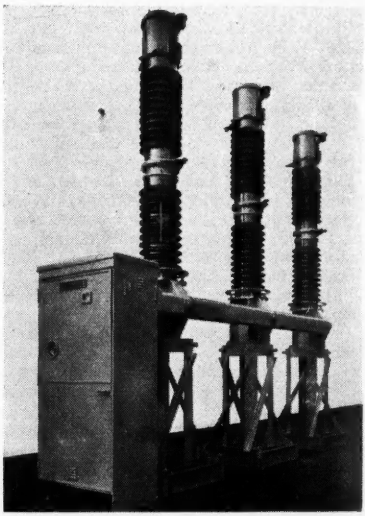
Renfrew Foundries, Ltd.,, Hillington, Glasgow, S.W.2. **B.723.**—Light alloy castings.

Revo Electric Co., Ltd., Tipton. **C.301 and B & D Outdoor.**—The new "Princess" 464 and 466 (illus.) electric cookers meet the requirements of the larger family. Like the smaller "Princess" models they include spacious hot cupboards, removable oven interiors and "Revostat" oven controls. All models can be supplied with either a heated drawer at the base or with a flush plinth. The new "Duchess" cooker has been designed particularly to meet the requirements of overseas buyers, who favour, amongst other things, the drop-down oven doors. The "R" and "Jubilee" cookers are also shown, together with a new model of the "Dandy" table cooker and an entirely new breakfast cooker. Domestic appliances include the "Revomatic" iron and kettle, the "Electrajug," "Challenger" and "Portex" irons and several designs of fires and tubular heaters. Among industrial and house-service switchgear are the new 2-piece consumer's service unit and the new cooker control unit. Both desk and ceiling fans are represented. From the comprehensive range of industrial lighting fittings available, the "Trufolite" and "Fullalite" reflectors have been selected to illuminate the stands. Street lighting fittings include new patterns for use with mercury, sodium vapour and tungsten lamps, together with "Sol-etern" fittings for fluorescent lamps. Concrete and cast iron standards, carrying brackets and lanterns of various patterns, are at each entrance to the Fair buildings.



Revo "Princess" 466D cooker

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne. **C.405.**—The central display is a 132 kV 600 A 2,500 MVA type OS10 small-oil-volume circuit-breaker (illus.), in the form of an open-terminal outdoor unit suitable for use in major generating and transmission stations. An 11 kV 1,200 A 250 MVA type-C6T 3-phase circuit-breaker panel is typical of the company's horizontal-draw-out metalclad switchgear range. A type S22A 1,200 A air-break circuit-breaker panel is one of a range with ratings up to 2,400 A and 37.5 MVA, particularly applicable to heavy-current medium-voltage circuits in industry and to power-station auxiliaries. Two flameproof mining switch-panels are also shown, as well as HH air-insulated medium-voltage switch-and-fuse



132 kV 3-phase 2,500 MVA pneumatic and spring operated open type small oil volume Reyroll circuit breaker

distribution gear, the latter being fitted with the latest type-GP cartridge fuse-links.

Rheostatic Co., Ltd., Slough. **C.500.**—Temperature control devices include cooker and water heater thermostats and motorized valves. A new modulating straight through valve for use with steam or hot water is provided with a reversing motor and control equipment to allow it to take up the required position to satisfy the particular temperature conditions at any time. The rod type cooker thermostat is supplemented by single and double switch models of hydraulically operated thermostats.

Joseph Rhodes & Sons, Ltd., Belle View Wakefield. **D.323.** — Metal Working machinery.

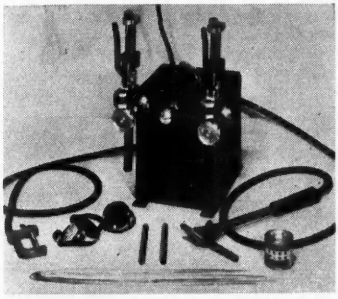
Rhymney Engg. Co., Ltd., 19, Woburn Place, London, W.C.1. **D.331/228.**—See International Combustion Co., Ltd.

Riley Stoker Co., Ltd., 19, Woburn Place, London, W.C.1. **D.241.**—Automatic stokers, "Syntron" vibrators, feeders, etc.

Robot Glass Cleaner Co., Ltd., Grove Street, Birmingham, 18. **C.224.**—Electric glass and cup washing machines.

Rollnick & Gordon, Ltd., Empire Way, Wembley. **C.728.**—See R. G. Dixon & Co., Ltd.

Donald Ross & Partners, Ltd., 88, Regent Street, London, W.1. **D.143.**—The "Twinner" portable electric welding and



"Twinner" portable welding and soldering unit

soldering unit (illus.) receives its heat from the resistance to carbon electrode. This method ensures localized heat and minimizes distortion. The unit is designed to work on all metals up to 16 s.w.g.

Rotherham & Sons, Ltd., 27, Spon Street, Coventry. **D.624.**—Process timers, time delays, etc.

J. Rowell & Son, Ltd., Boyd Street, Newcastle-upon-Tyne, 2. **A.650.**—"Ace" washing machines and "Thermecon" boilers.

Rozalex, Ltd., 10, Norfolk Street, Manchester, 2. **D.706.**—Preparations for protection against industrial dermatitis, etc.

Rubber Bonders, Ltd., Dunstable. **D.700.**—Designed parts in rubber bonded to metal, flexible couplings, anti-vibration mountings, etc.

Ruberoid Co., Ltd., 1-19, New Oxford Street, London, W.C.1. **B.423.**—Electrical insulating materials.

Rubery, Owen & Co., Ltd., Darlaston. **D.717/616.**—Products of the Owen organization include battery driven "Conveyancer" fork lifting trucks and Invicta welding electrodes.

Runbaken Electrical Products, 71-73, Oxford Road, Manchester. **C.730.**—The

Runbaken "Autofeed" soldering iron

new "Autofeed" soldering iron (illus.) holds 20ft of cored solder and has a readily interchangeable copper bit. It weighs only 13oz. Other products are test equipment, including a portable shock finder, transformers, rectifiers, electric tools, welding and plating equipment.

E. Rudd & Co., Ltd., Holyhead Rd., Handsworth, Birmingham, 1. **C.216.**—Nameplates.

Ryland Works, Ltd., Chesterfield.—**A.519.**—"Ryland Briteheat" electric fires.

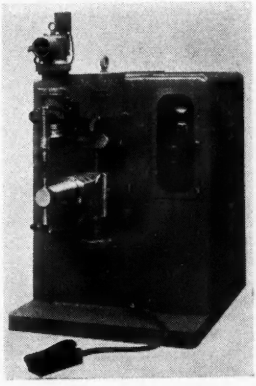
St. Helens Cable & Rubber Co., Ltd., Liverpool Rd., Slough. **C.413/316 and D.108.**—Electric cables and accessories, mouldings, extrusions, anti-corrosion linings, etc.

Sangamo Weston, Ltd., Great Cambridge Road, Enfield. **C.604.**—Meters of all types, small synchronous motors, laboratory standards and portable instruments, d.c. galvanometers, frequency meters, a radio analyser, panel and switchboard instruments, relays, photometers and exposure meters and aircraft instruments.

J. H. Sankey & Son, Ltd., Aldwych House, London, W.C.2. **B.406.**—Refractory and acid-resisting materials are among this company's products.

Schori Metallising Process, Ltd., Brent Crescent, London, N.W.10. **D.524.**—Metal and plastic spraying by the powder process is demonstrated on this stand.

Sciaky Electric Welding Machines, Ltd., Farnham Road, Slough. **C.222.** — In



Sciaky S.A.T.75 three - phase spot welding machine

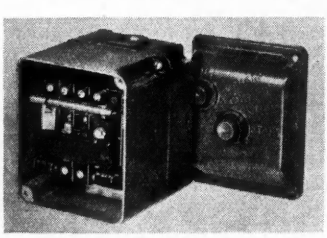
the S.A.T. 75 three - phase spot welding machine (illus.) the load is taken from all three supply lines with equal loading on each line and at a power factor of 80-90 per cent. The new P.A.100 projection welding machine rated at 100 kVA nominal can be supplied for either single or three-phase supplies. All control equipment, including the ignitron contactor panel, is mounted within the frame. Two of the latest spot and seam welders complete the company's display.

Scottish Cables, Ltd., Deanside, Renfrew. **C.319.**—Paper and rubber insulated cables range from the smallest flexible to 33 kV cable. Of considerable interest are "**Renex**" anti-corrosion sheathed cables, "**Renite**" railway signalling cables and various cable accessories.

Seal Conduit Co., Ltd., Cable Street, Wolverhampton. **D.725.**—Aluminium electrical conduit, and steel conduit fittings in galvanized, black, silver, grey and self-colour finishes.

Senior Economisers, Ltd., 11, Southampton Row, London, W.C.1. **D.241.**—The main exhibit is a welded type economiser as used in central power stations to operate at working pressures up to 2,100 lb per sq in. A quarter-scale model of the "H" economiser for pressures up to 450 lb per sq in is fitted with a traversing-type soot blower.

Sharp Control Gear, Ltd., 26, Redditch Road, Birmingham, 30. **C.211.**—A patent snap-action cam-operated contactor is a feature of most of the company's products which include controllers for diesel or petrol-electric cranes and electric vehicles; mining switchgear auxiliary starters; manual controllers; push-button starters



Sharp automatic push-button starter

(illus.); pendant, reversing and limit switches.

Sheffield Smelting Co., Ltd., Royds Mill Street, Sheffield, 4. **D.731.**—Contacts made from precious metals and some non-ferrous metals are accompanied by fuse wires and tapes, ignition contacts, "Thessco" plating anodes and salts; silver solders and brazing rods, special fluxes, and platinum platinum/rhodium thermocouple wires.

Siemens Brothers & Co., Ltd., London, S.E.18. **C.413/316.**—Cables and accessories.

Sigmund Pumps, Ltd., Team Valley, Gateshead. **D.337.**—Pumps.

Silent Machine & Engg. Co., Ltd., Albion Works, Sheffield. **D. Outdoor.**—Food preparation machinery.

Simmonds Aerocessories, Ltd., Treforest, Glamorgan. **D.427.**—Elastic stop nuts and "Pinnacle" metal diaphragm nuts are shown in all types. The "Spinloc" one-piece free running lock nut is a new product. The "Pacitor" electronic contents gauge is demonstrated.

Simplex Electric Co., Ltd., Oldbury, Birmingham. **C.507/406.**—A compact new 15A interlocking switch-plug for a.c. incorporates a d.p. positive slow break, short break action and a robust interlock. "Regent" switch fuses, streamlined cooker control units and "Monarch" heavy duty gear are accompanied by industrial, flameproof, street, commercial and flood lighting equipment. The latest "Creda" EV.13 domestic cooker is shown in various finishes, together with a new restaurant range, a glass hotcupboard, water heaters, kettles and irons.

Stainless steel fire (James Smellie, Ltd.)

James Smellie, Ltd., Oxford Street, Dudley. **B.628.**—Among several electric fires in antique copper and real bronze is a new stainless steel model (illus.).

Frederick Smith & Co., 24, Queen Anne's Gate, London, S.W.1. **C.320.**—Hard and soft copper strip for armature winding turbo-alternators, transformers, electric motors and for generating station use; also electrolytic copper wire for insulation, power transmission, telephone and television cables, fuse wires, and for use in plating.

John Smith (Keighley), Ltd., Keighley. **D. Outdoor.**—Overhead travelling and derrick cranes, stone working plant, etc.

Smiths Industrial Instruments, Ltd., Cricklewood Works, London, N.W.2. **D.727.**—Prominence is given to a new range of counters for industrial purposes. New types of electric tachometers operating in conjunction with a generator at the driving source are particularly suitable for use where the instrument needs to be remote from the source of drive. Thermometers, thermostats and the "Desynn" system of remote indication are also to be seen.

Southern Forge, Ltd., Langley, Bucks. **B.723.**—Extrusions, tubes and forgings in aluminium alloys; conduit tubes.

Sperryn & Co., Moorsom Street Works, Birmingham, 6. **C.421.**—Among a representative range of electrical accessories special prominence is given to heavy-duty "T.A." lampholders which are particularly suitable for factory and railway use.

Spiral Tube & Components Co., Ltd., Osmaston Park Road, Derby. **D.710.**—Unit heaters, air heaters and coolers, transformer oil coolers, refrigerator coils, etc.

Standard Telephones & Cables, Ltd., 63, Aldwych, London, W.C.2. **C.225/102 and C.413/316.**—This display is representative of the company's research, development and manufacturing activities in the field of telecommunications.

Stanton Ironworks Co., Ltd., near Nottingham. **B.719/626 and B. Outdoor.**—Lighting columns and transmission poles.

Star Foundry Co., Ltd., Batmans Hill Road, Bradley, Bilston. **A.310.**—Phosphor bronze and aluminium for the electrical industry.

Steel & Co., Ltd., 14, Berkeley Street, London, W.1. **B.617 and D. Outdoor.**—In addition to "Coles" electric hoist blocks are seen the latest "Electric Eel" industrial trucks. In the Outdoor exhibit the application of the magnetic grab to a mobile crane is demonstrated.

Stephens Belting Co., Ltd., Snow Hill, Birmingham, 4. **D.233.**—Two new products are the "Miraclo" "D" endless flat belt for short centre drives and an infinitely variable reduction box.

Sterling Cable Co., Ltd., Aldermaston, Berks. **C.233.**—The new "Sterline" overhead line wire is designed to withstand extremes of temperature and humidity. It is lighter in weight and smaller in diameter than the normal aerial cable. This enables longer runs to be made under "no sag" conditions and it has less resistance to wind pressure and a smaller area for ice-load. It is also cheaper. Special cable for television work has also been developed.

B. J. M. Stern, Ltd., Suffield Street, Middleton, Lancs. **C.723a.**—Domestic and commercial refrigerators include "maisonnette" models.

Stewarts & Lloyds, Ltd., Brook House, Upper Brook Street, London, W.1. **B.404, D.511/408 and D. Outdoor.**—Steel tubes, joints and fittings and tubular steel fabricated products, including cable drums.

Stirling Boiler Co., Ltd., 32-33 Farringdon Street, London, E.C.4. **D.407/306.**—Special attention is drawn to the recent boiler installation at Kingston-on-Thames.

W. & S. Summerscales' Sons, Parkside Works, Keighley. **A.521.**—Electric washing machines.

Taylor & Challen, Ltd., Derwent Works, Birmingham, 19. **D.415.**—Among various presses shown is an automatic unit with grip and transfer feed for the production of brass parts such as lampholders from strip.

Taylor & Wilson, Ltd., Accrington. **A.406.**—Washing machines.

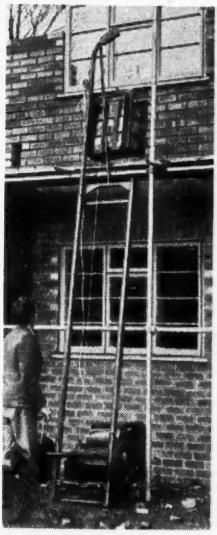
Telsen Electric Co. (1935), Ltd., Fitzgeorge Street, Manchester, 9. **C.721.**—Almost all the 200 or so electrical accessories and appliances made show improvements in design. New lines are brass lampholders, switches, iron connectors, a 1 kW tubular portable immersion heater with moulded handle, kettle elements, soldering irons and decoration lights.

Herbert Terry & Sons, Ltd., Redditch. **B.424.**—The "Anglepoise" adjustable lamp in new finishes is accompanied by springs, wirework, presswork, flexible shaft, hose clips, cable clips, etc.

Bertram Thomas (Engineers), Ltd., Worsley Street, Manchester, 5. **D.309.**—Exhibits comprise electric buffets, motor car engine pre-heaters, hot plates, plate warmers, the "Bi Heat Tunnel" heater combining radiated and convected heat, and a greenhouse heater.

G. Thompson, 241-243, Heigham Street, Norwich. **C.223.**—See **Anglow Electric.**

John Thompson, Ltd., Ettingshall Works, Wolverhampton. **D.521/418.**—Among scale models of power station plant is one showing two of eight boilers being installed at West Ham. A fusion welded boiler drum 3ft 9in. in diameter and 23ft 9in long and weighing 11½ tons has an operating pressure of 450lb per sq in. Various types of superheater are represented. A patent submerged belt ash conveyor demonstrated is much in demand for ash removal from power stations and industrial plant. High pressure pipework, special flanges, etc., are shown; also anti-corrosion compounds.



Thwaites electric brick hoist

Thor Appliances, Ltd., 55-59, Oxford Street, London, W.1. **C.612.**—The "Automagic" clothes and dish washing machine.

Thwaites Agricultural Engineering Co., Ltd., Welsh Road Works, Cubbington, Leamington Spa. **D. Outdoor.**—Builders' hoist (illus.) driven by a 1½ h.p.-2 h.p. electric motor has a lifting capacity of 300lb.

Thorn Electrical Industries, Ltd., 105-109, Judd Street, London, W.C.1. **C.313.**—To demonstrate a new fluorescent dimming device coloured light from a bank of "Atlas" tubes is alternately dimmed and brought up.

to full brightness. Fluorescent lighting units for industrial, commercial and residential use include new types for shop window, street, hospital and home lighting. Among incandescent lighting lamps are special types for aircraft, ships, trains, buses, etc. A new range of slim control gear for 15 W, 20 W, 30 W and 40 W fluorescent tubes can be seen with a new two-pin glow switch for 30 W and 40 W and a new safety bi-pin holder. The "Mary Ann" food mixer makes its first appearance. In addition to the "Doubleway" heat-controlled iron, a lightweight model is being introduced.

Tin Research Institute, Fraser Road, Greenford, Middlesex. D.141.—Advice is given on applications of tin and its alloys.

Trico-Folberth, Ltd., Great West Road, Brentford. **C.308.**—Motor car equipment made specially for overseas customers includes "Clignoteur" flashing-light signals.

Ronald Trist & Co., Ltd., Bath Road, Slough. **D.226.** — Boiler controls and alarms, stoker cut-outs, tank level controls, electronic fire detectors, etc.

Trumeter Co., Ltd., "Sunnyside," Leicester Road, Salford, 7. **D.740.**—Counting and measuring instruments.

Truvox Engineering Co., Ltd., Exhibition Grounds, Wembley. **C.215.**—Domestic and industrial floor polishers are demonstrated.

Tube Products, Ltd., Popes Lane, Oldbury. **D.621/520.** — "Tru-Wel" electrically welded steel tubes.

Tudor Accumulator Co., Ltd., 50, Grosvenor Gardens, London, S.W.1. **C.109.**—This company specializes in batteries for traction, lighting and power, switch operating in power stations, telephone exchanges and for marine use. Both open and sealed types of stationary cells are represented. A "Safetylyte" emergency lighting equipment with a 100 V battery is operating.

Turner Bros (Birmingham), Ltd., Villiers land Street, Birmingham, 19. **D.512.** — Power presses.

Turner Manufacturing Co., Ltd., Villiers Street, Wolverhampton. **D.316.** — Diesel lighting plant.

Turton Bros. & Matthews, Ltd., P.O. Box 40, Wentworth Street, Sheffield. **D.413.**—Permanent magnets.

Vactite Wire Co., Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.320.**—Molybdenum tape and wire; nickel chromium wires and tapes, bright or oxidized for resistance heating up to 1,100 deg. C.; "Eureka" copper-nickel wires and tapes for resistances, thermo couples, compensating leads, and heating elements operating at below 300 deg C; and wires for lamps and valves.

Valbania, Ltd., Hartington Road, London, S.W.8. **B.170.**—Lighting fittings.

Van Dorn Electric Tools, Harmondsworth. **C.607.**—See **Black & Decker, Ltd.**

Veret, Ltd., Graham Road, Bexleyheath. **A.620.**—Bedwarmers and door chimes.

Walker Fender Co., Ltd., Sherborne Street, Birmingham, 16. **A.230.**—Standard lamps.

James Walker & Co., Ltd., Woking. **D.430.**—Packings and jointings.

Walls, Ltd., 202, Fazeley Street, Birmingham, 5. **A.313.**—Electric fires, kettles, percolators, etc.

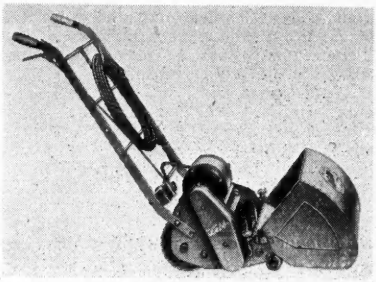
Walsall Conduits, Ltd., Hill Top, West Bromwich. **C.715.**—Conduit, conduit fittings, switches, switchplugs, including weatherproof units, fuseboards, switchgear, industrial lighting equipment, flameproof lighting fittings, trunking, underfloor ducting and tubular heaters.

Thos. W. Ward, Ltd., Albion Works, Sheffield. **D.745 and D. Outdoor.**—Products of the company and its subsidiaries include specialized castings, forgings, wrought iron sections, "Silent" food preparing machinery, overhead travelling cranes, derricks and stone working machinery.

Warico (Gt. Britain), Ltd., 2, North St., Coventry. **B.622.**—Electric fireplaces.

Watliff Co., Ltd., Lombard Rd., London, S.W.19. **C.101.** — Commutators and sliprings of all sizes.

H. C. Webb & Co., Ltd., Tame Road, Birmingham, 6. **A.511.**—The Webb 14 in



Webb electric lawnmower

electric lawnmower (illus.) has been designed specifically for electrical operation.

Weldall & Assembly, Ltd., Eyre St., Birmingham, 18. **B.304 and B. Outdoor.**—Fractional-h.p. induction motors.

Westinghouse Brake & Signal Co., Ltd., 82, York Way, London, N.1. **C.508 and D. Outdoor.**—A new method of automatic constant current density control (illus.) for electroplating power supply by "Westalite" rectifiers automatically maintains the current density at the surface of the work constant, regardless of the area of the work in the vat. Typical of applications of "Westalite" rectifiers to industry are working exhibits of a magnetic separator,

a vibrating screen and an automatic weighing machine, all operated from a.c. supplies through rectifiers. A new method for preventing the corrosion of buried pipe lines by cathode protection is also demonstrated. Static phase convertors supplying three-phase to a 5 h.p. compressor motor from

Westinghouse panel for automatic current density control

the incoming single-phase supply show the excellent voltage balance obtained between phases even under conditions of high starting torque. Brakes for electric trains, trolley buses, etc., are seen working, while the industrial use of compressed air is shown by a working demonstration of remote control by means of electromagnetic valves. In the colliery plant exhibit in the Outdoor Section the railway signalling display comprises a complete signal cabin with a control panel as used with relay interlocking systems, and a power interlocking frame.

A. C. Wickman, Ltd., Banner Lane, Tile Hill, Coventry. **D.416.**—A film illustrates the technique of applying "Wimet" tungsten carbide turning tools, while demonstrations are given of the qualitative and dimensional checking of finished components in almost any material by the "Cornelius" electronic comparator.

Wild-Barfield Electric Furnaces, Ltd., Elecfurn Works, Watford By-pass, Watford. **C.321/220.**—Equipments, mostly for toolroom use, include the "TRT 1010" tempering furnace for temperatures up to 650 deg. C. Horizontal batch type furnaces are represented by a "Workshop" unit. The "E.S.B. Minor" electrode salt bath has alternative metal and refractory pots. Laboratory electric muffles illustrate the advantages of the "Paragen" system of atmosphere control. Radio frequency heating is covered by a Ferranti-Wild-Barfield "2 BDP" dielectric set and a "2 AI" induction heater. An "E.P.2" intermittent electric pottery kiln for temperatures up to 1,300 deg. C made by the company's subsidiary, the Applied Heat Co., Ltd., is suitable for trial firings in large potteries or for use by artist potters.

A. H. Wilkes & Co., Ltd., Stourport. **D.505.**—See William Allday & Co., Ltd.

Wilkins & Mitchell, Ltd., The Green, Darlaston. **C.713 and D.600.**—Improvements to the "Servis" electric washing machine, seen on stand C.713, include a new completely sealed gear box, a plastic agitator, pumps and a 1½ kW heating element if required. A 150-ton power press is among exhibits on stand D.600.

Williams (Birmingham), Ltd., Westwood Rd., Birmingham, 6. **A.413/314.**—"Atlas" aluminium ware for electric cooking.

Willmot Trucks, Ltd., Scotts Green, Dudley. **D.644.**—Power elevating trucks and fork lift trucks.

R. H. Windsor, Ltd., 16, Finsbury Sq., London, E.C.2. **C.310.**—Injection moulding and extrusion machines.

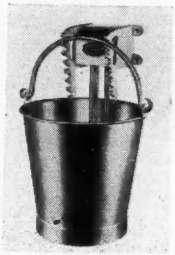
Wire Drawing Dies (Manchester), Ltd., Adelphi Iron Works, Salford, 3. **D.249/144.**—Diamond and tungsten carbide dies, mandrels, etc.

Wireohms, Ltd., Peas Hill Rd., Nottingham. **C.210.**—See H. J. Baldwin & Co., Ltd.

S. Wolf & Co., Ltd., Hanger Lane, London, W.5. **C.603.**—Apart from portable electric drills, screwdrivers, grinders, polishers, sanders, blowers, chisel mortisers, hammer kits, there is a range of car engine reconditioning equipment, including the "Mobilectric" engine workshop.

Wolseley Sheep Shearing Machine Co., Ltd., Electric Avenue, Birmingham, 6. **D.713/and D. Outdoor.**—In addition to electrically operated sheep shearing and horse and cattle clipping machines, electric fencers and electric animal drovers, there are two new items—a dairy bucket heater

Wolseley dairy bucket heater



(illus.) and a chilled water milk cooling unit, incorporating an electrically operated compressor and pump.

Yale & Towne Manufacturing Co., Willenhall, Staffs. **D.423/324.** — The ½-ton "Wizard" electric hoist weighs only 120 lb and has a speed of 15ft per minute. Safety limit stops are provided and the motor brake is interlocked with the controller.

Yardley Wavis, Ltd., Wyle Cop, Shrewsbury. **C.704.**—House lighting and battery charging generating sets.

Yorkshire Copper Works, Ltd., Leeds. **B.727/634.** — "Yorcalbro" (aluminium brass) and cupro-nickel power station condenser tubes panel the stand.

Young Accumulator Co., Ltd., 95, Aldwych, London, W.C.2. **C.609.**—See Crompton Parkinson, Ltd.

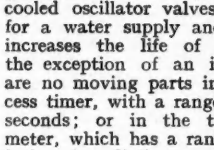
Zinc Alloy Rust-Proofing Co., Ltd., Shakespeare St., Wolverhampton. **B.720.** Rust-proofing by the Sherardizing process.

London Displays

EXHIBITS ARE AT OLYMPIA UNLESS OTHERWISE STATED

Adamson & Co. (Machines), Ltd., Upper Accommodation Road, Leeds, 9. **Earls Court Q.700.**—Cloth cutting machines.

Airmec Laboratories, Ltd., 19, Charterhouse Street, London, E.C.1. **C.134.**—The type 723 d.c. oscilloscope incorporates an automatic brilliancy control for the spot which is useful when photographing, while an electronic ionization voltage tester embodies a new principle to avoid damage to insulation under test. In an electronic heat generator (2 kW or 5 kW) the use of air cooled oscillator valves obviates the need for a water supply and also considerably increases the life of the valves. With the exception of an internal relay, there are no moving parts in an electronic process timer, with a range of from 10 to 180 seconds; or in the type 726 frequency meter, which has a range for 30 c/s to 20 kc/s. A radiation monitor detects radioactive material in all substances. Other



Airmec d.c. oscilloscope

items shown include signal generators, an electronic decade counter, power output and frequency meters, a radiation monitor and "Telecom" inter-office equipment.

Ashley Bros., West Hendford, Yeovil. **Earls Court R.103.**—Electrically heated glove ironing hands and stands.

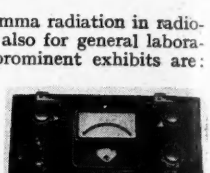
Baird & Tatlock (London), Ltd., 14-17 St. Cross Street, London, E.C.1. **C.5.**—The new Mullard-B.T.L. potentiometric apparatus for Karl Fischer titrations.

Bakelite, Ltd., 18, Grosvenor Gardens, London, S.W.1. **Earls Court X.22.**—See Birmingham Section.

A. J. Balcombe, Ltd., 52-58, Tabernacle Street, London, E.C.2. **G.53.** — New "Alba" products include a portable radio receiver for a.c., d.c. or batteries, and all-dry-battery sets and a table television receiver. The "Midget" receiver, claimed to be the smallest all-wave superhet, is now available in pastel shades. Bandspread tuning has been further developed.

Baldwin Instrument Co., Ltd., Brooklands Works, Dartford. **C.19.**—Baldwin-Farmer electrometers are available for measuring X-ray and gamma radiation in radiological practice and also for general laboratory use. Other prominent exhibits are:

Baldwin electrometer-voltmeter



X-ray dose and dose-rate meters, a light quantity meter, a cinema screen photometer, a mains resistance meter, an a.c. bridge visual null indicator, a steel-strip extension gauge and pivoted indicating instruments.

Beetle Products Co., Ltd., 1, Argyll Street, London, W.1. **Earls Court X.26 and X.33.** — Moulded articles made from Beetle urea and melamine moulding powders.

Bellingham & Stanley, Ltd., 71, Hornsey Rise, London, N.19. **C.56.**—Colour testing apparatus, photometers, etc.

C. H. Blackburn & Co., Ltd., 10, Gray's Inn Road, London, W.C.1. **C.103.**—"Stellex" electrically heated hospital equipment includes an improved food conveyor, bowl and instrument sterilizers, and physiotherapy equipment. A new range of immersion heaters for domestic and industrial use is introduced, while among photographic accessories are a new flash-synchronizer, a solution heater and a dish-warmer.

Bowen Instrument Co., Ltd., 401a, York Road, Leeds, 9. **C.36.**—Pyrometers, process timers, d.c. amplifiers, millivoltmeters and milliammeters.

Chas. F. Bristol & Son, Ltd., Regent Place, Birmingham, 1. **K.63.**—Lighting fittings and shades.

British Ebonite Co., Ltd., Nightingale Road, London, W.7. **Earls Court X.29.**—Ebonite rod, sheet, mouldings, etc.

British Geon, Ltd., 21, St. James's Square, London, S.W.1. **Earls Court X.11.**—Electrical grade p.v.c.

British Heat Resisting Glass Co., Ltd., Phœnix Works, Bilston, Staffs. **Earls Court S.28.**—Glass insulators machined to very fine tolerances are in demand in the electronic fields; some of the exhibits have been made for radio installations in Persia. Other scientific glassware, as well as "Phœnix" heat-resisting glass ovenware, can also be seen.

British Industrial Plastics, Ltd., 1, Argyll Street, London, W.1. **Earls Court X.26**

and **X.33.** — "Beetle" synthetic resins, moulding powders, etc.

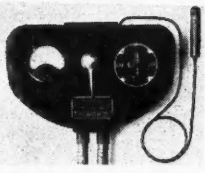
British Moulded Plastics, Ltd., Walthamstow Avenue, London, E.4. **Earls Court X.45.** — Compression and injection mouldings; also "Telenduron" bitumen asbestos compound.

British Resin Products, Ltd., 21, James's Square, London, S.W.1. **Earls Court X.12.** —Moulding powders.

British Tabulating Machine Co., Ltd., 17, Park Lane, London, W.1. **E.7.**—The short card equipment offers all the advantages of Hollerith punched card electrical accounting and tabulating technique at the lowest possible cost.

British Vacuum Cleaner & Engineering Co., Ltd., Goblin Works, Leatherhead. **E.40/48, G.54, H.553 and W.6.** — "Magneta" time recorders, job costers, public address equipment, synchronous clocks and "Loudspeakerphone" internal telephone systems form the principal exhibits on stand E.40/48. Stand G.54 contains "Magneta" industrial radio, synchronous clock systems, amplifiers and public address systems, while the "Goblin Teasmade" automatic tea maker, electric clocks, "Magneta" synchronous clocks and timing apparatus are contained on stand H.553. Exhibits on stand W.6 are domestic and light industrial vacuum cleaners.

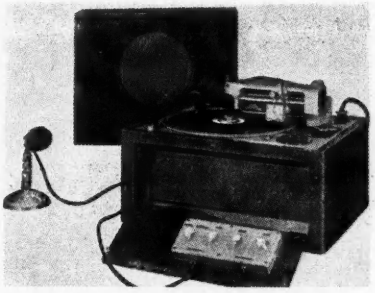
British Rototherm Co., Ltd., London, S.W.19. **C.82.**—A heavy industrial bimetallic thermometer meets conditions where more than normal vibration is present. In two new mercury-in-steel non-indicating controllers the mercury switch is operated directly by a Bourdon tube. Both these controllers have a control differential of approximately 5 per cent of the scale deflection and one is fitted with an ammeter and master control switch. A distant reading indicating temperature controller has adjustable maximum/minimum contacts and a built-in relay which is capable of controlling loads of up to 2.5 kVA.



British Rototherm non-indicating controller

J. & F. Brooks, Ltd., 50-54, Shudehill, Manchester, 4. **K.119.**—Floor and table lamps.

S. G. Brown, Ltd., Shakespeare Street, Watford. **C.110.**—Three new disc recorders are a 13in portable unit, a 13in professional synchronous recorder, primarily for film work, and a 17in heavy duty unit. Headphones, precision motors, gyro compass and automatic helmsman equipments are on view.



S.G.Brown 13 in portable disc recorder

Bulmer's (Calculators), Ltd., 7-8 Poultry, London. E.C.2. **E.4.**—Electrically-operated calculating machines.

B. X. Plastics, Ltd., Higham Station Avenue, London, E.4. **Earls Court X.8 and X.15.**—Sheet, rod, tube, powders, paste and specially designed extrusions, cover "Xylonite" (celluloid), "Bexoid" (cellulose acetate), p.v.c., "Lactoid" (casein), polystyrene, ethyl cellulose and "Isoflex" (lightweight thermal insulation).

Cable & Wireless, Ltd., Electra House, Victoria Embankment, London, W.C.2. **A.7.** — Universal electric clocks of a new design show the time throughout the world. A high-speed photo-electric telegraph transmitter, capable of sending 800 words a minute is demonstrated.

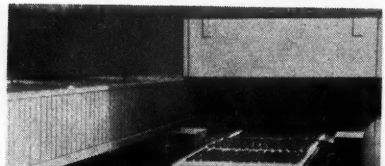
Rowland Carvendale, Ltd., 6-12, Thistle Street, Edinburgh. **K.8.**—Table lamps in pottery, glass, wood and metal.

Chance Brothers, Ltd., Smethwick, 40. **C.2 and Earls Court 530.**—Items of electrical interest are glass trays for refrigerators; soda lime tubing for fluorescent lighting; pressed lenses for marine, road and railway lighting; arc mirrors for cinema projectors; and opal and coloured lighting glass, shades, bowls, spheres, cubes, etc.

Channel Islands Radio Engineering Co., Ltd., St. Saviours, Jersey. **G.21.**—Radio apparatus and laboratory instruments.

Cinema-Television, Ltd., Worsley Bridge Road, London, S.E.26. **C.50.**—The new "Cintel" industrial electronic batching counter separates small objects fed from a bulk supply into batches of any required number up to 1,024. An improved portable metal detector can be supplied with an oscillator for tracing the course of buried pipes and cables at depths of up to 30ft, while a new electronic device detects metal in chemicals, plastics, textiles, food-stuffs, etc. A wide range capacity bridge covers from 100 μF to 0.1 $\mu\mu$F in 18 ranges, the first scale reading being 0.001 $\mu\mu$F. A

mutual inductance bridge has a range from 30 millihenries to 0.03 microhenries of mutual or self inductance in 12 ranges, the first scale reading being 0.001 microhenries.



"Cintel" industrial electronic metal detector being used for the inspection of chocolate biscuits

Oscilloscopes comprise universal, demonstration and laboratory types.

Clyde Clocks (British & Foreign Agencies, Ltd.), 37, Colvend Street, Glasgow, S.E. **H.558.**—Electric alarm clocks.

E. K. Cole, Ltd., Southend-on-Sea. **G.41, G.51 and Earls Court X.53.**—Domestic radio is represented by new table, console and portable models; also radiograms, many specially designed for overseas markets. Besides car radio equipments there is a new motor cycle radio transmitter/receiver of particular interest to police, etc. Aircraft communication is also covered. Improved television receivers have increased sensitivity and "range," built-in radio and mirror-viewing. The Ekco indoor television aerial reduces installation costs. Among developments in electronics and atomic research are the Ekco cloud and collision radar warning equipment for aircraft; a nuclear scaler and linear amplifier; power units, rate meters and portable monitors. At Earls Court the E. K. Cole Plastics Division demonstrates its versatility as general moulders to industry.

John Compton Organ Co., Ltd., Minerva Road, London, N.W.10. **G.40.**—Variable control space heater and electronic organ.

A. C. Cossor, Ltd., Highbury Grove, London, N.5. **C.16.**—Oscillographs, an instantaneous permanent recording electrocardiograph, a "Wobbulator" hæmoglobinometer and a comparative colorimeter are some of the interesting instruments shown.

Counting Instruments, Ltd., 91, Regent Street, London, W.1. **C.132.**—Electromagnetic counting instruments are made for checking, measuring and controlling industrial and scientific processes. Special applications include direct reading indices for electricity meters.

Cox-Cavendish Electrical Co., Ltd., 46-47, Marylebone High Street, London, W.1. **C.64.** — Induction coils are made for high voltage testing of insulation of cables, etc., and for laboratory research (2in to 10in spark length). A portable high frequency test set for locating faults and breaks in insulating materials is another speciality. Electro-medical products include combined treatment tables, surgical diathermy and cautery apparatus, portable combined galvanic, faradic and sinusoidal sets.

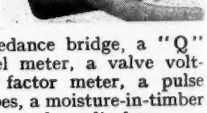
Stanley Cox, Ltd., 11, Gerrard Street, London, W.1. **C.55.** — The new 11/500 crystal controlled ultra-short-wave diathermy unit will not cause interference with television, etc. The "Electromyograph" assists diagnosis of neuro-muscular disorders. The "Surjatron" electronic unit for developing and applying faradism in a surged wave form takes the place of the old "make" and "break" faradic coils which were extremely uncomfortable in use.

Crayonne, Ltd., St. Bernard Works, Bexley. **K.64.**—Domestic electrical goods.

R. Cruickshank, Ltd., Camden Street, Birmingham, 1. **B.32.**—Chemicals for electroplating.

Geo. Davidson & Co., Ltd., Gateshead-on-Tyne, 8. **Earls Court S.33.**—Industrial and lighting glassware.

Dawe Instruments, Ltd., 130, Uxbridge Road, London, W.7. **C.15.**—An electronic watch rate recorder gives an immediate and permanent record of time-keeping properties. A musical tuner, a wave analyser, photographic flash units and a high speed oscilloscope are other new products. Also shown



Dawes watch rate recorder

are a universal impedance bridge, a "Q" meter, a sound level meter, a valve voltmeter, a distortion factor meter, a pulse generator, stroboscopes, a moisture-in-timber meter and a high-speed audio-frequency recorder.

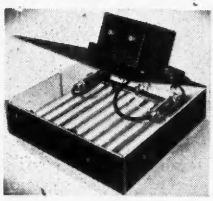
De La Rue Insulation, Ltd., 84-86, Regent Street, London, W.1. **Earls Court X.2.** — "Delaflex" insulated sleevings, "Hamofil" connecting wires, "Delaron" laminated plastic, "Traffolyte" engraving and printing plastic, etc.

Denhams (Norwich), Ltd., Woodhouse Works, Todmorden. **C.120.**—"Norvic"

and "Corona" heating pads and blankets.

Dernier & Hamlyn, Ltd., 23, Newman St., London, W.1. **K.107.**—Lighting fittings include the "Litlux" bed lamp.

De Vere (Kensington), Ltd., 5, Kensington High Street, London, W.8. **C.113.**—Cold cathode lighting equipment developed for photographic enlarging includes colour corrected units for colour photography. Though rated at only 100 W the tube is twenty times faster than an ordinary 100 W lamp and remaining cold in operation can be used close to the negative. Switching is instantaneous and the tubes have a life of approximately 10,000 hours.



De Vere cold cathode lighting unit

Dubilier Condenser Co. (1925), Ltd., Victoria Road, London, W.3. **G.49.**—Capacitors and resistors include designs to withstand the most stringent tropical conditions. The latest development in electrolytic capacitors, ear-mounting "Drilitic" units take the maximum advantage of the size reductions to provide a more rapid and efficient method of mounting and fixing. A new development in miniaturization consists of a metallized paper capacitor section moulded in a specially hard resin; these capacitors are extremely small and are impervious to atmospheric moisture. Suppressor capacitors are available for incorporation in electrical equipment in anticipation of the Wireless Telegraphy Bill (1948) coming into force. Moulded filter and coupling units provide an alternative to "printed" circuits and components.

Dunlop Special Products, Ltd., Fort Dunlop, Birmingham. **B.36.**—See Birmingham Section.

Ebonestos Industries, Ltd., Rollins St., London, S.E.15. **Earls Court X.37.**—Plastic mouldings in synthetic and natural resins and bitumen.

W. Edwards & Co. (London), Ltd., London, S.E.26. **C.17.**—With the introduction of three new models, the "Speedivac" series of high vacuum rotary pumps now covers applications from simple laboratory experiments to large-scale industrial processes. Outstanding features are the minimum weight and dimensions, small oil capacity, high pumping speed, quiet running and attractive finish. Vacuum coating plant provides means for depositing thin films of metals, alloys and salts on bases, metallic and non-metallic, conducting and non-conducting. Oil diffusion pumps, high vacuum gauges, a new vacuum controller and an electronic microammeter are also on view.

Electrix, Ltd., Sterling Works, Dagenham. **Earls Court W.2.**—The "Silent Electrix" and "Nu Electrix" vacuum cleaners, a floor polisher and an industrial all-purpose sprayer.

Electrolux, Ltd., 153-5, Regent Street, London, W.1. **Earls Court W.5.**—See Birmingham Section.

Electronic Developments (Surrey), Ltd., 18, Villiers Road, Kingston-upon-Thames. **N.3.**—A radio control unit for model aircraft, boats, cars, etc., has a range of up to three miles.

Elliott & Spear, Ltd., Oakhill, Hildenborough, Tonbridge. **K.21.**—Table lamps and lampshades.

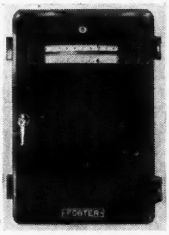
English Numbering Machines, Ltd., 25, Queensway, Ponders End. **E.85.**—Counting and numbering machines.

Evans Electroselenium, Ltd., Harlow. **C.14.**—An "Eel" test-tube colorimeter for blood testing, a reflectometer for measuring colour-blindness, a densitometer for measuring the concentration of coal dust in mine workings, a photometer for measuring light in mines, a densitometer for use in the printing and photographic trades, a cinema screen brightness meter, and a light sensitive relay are of special interest.

Everett, Edgcumbe & Co., Ltd., Colindale Works, London, N.W.9. **C.65.**—Electrical, indicating and recording machines, test sets, special instruments for industry, laboratory and radio service, photometers, relays, speedometers, synchronous timing motors, clocks and process control gear.

R. N. Fitton, Ltd., Hutchinson Lane, Brighouse. **G.18.**—Notable items are a corner cabinet television receiver and a radiogramophone.

Foster Instrument Co., Ltd., Letchworth. **C.8.**—Among instruments available for temperature measurement and control are new "Introscopes" for internal examinations. One new indicating temperature controller operates on the electronic principle, and there is an "Introscope" for examining impellor blades of jet engines.



Foster indicating temperature controller

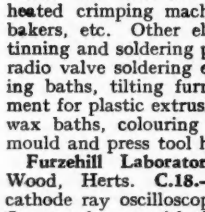
John A. Fransen, Ltd., County Hall, Northwood, Middlesex. **H.101.**—The "Rabaldo" electric dry shaver is fitted with direct action shaving head. The

"Forfex" electric haircutting machine for the use of veterinary surgeons, furriers, wool carpet manufacturers, etc., as well as hairdressers, is specially designed to give swift, smooth and quiet action in continual use.

Fraser & Glass, Ltd., Woodside Lane, North Finchley, London, N.12. **Earls Court X.50.**—Annually this company produces over twelve million plastic coil-winding bobbins, many to individual requirements, but most as part of its "Tool-Free" range. Many mouldings for the electrical and radio industries are shown.

Funditor, Ltd., 3, Woodbridge Street, London, E.C.1. **F.17 and F.32.**—The main display is of electrical apparatus for the printing industry, such as metal pot heaters, metal melting furnaces, automatic metal feeders and time switches. An electrically heated crimping machine is of interest to bakers, etc. Other electrical products are tinning and soldering pots, an electric ladle, radio valve soldering equipment, large tuning baths, tilting furnaces, heating equipment for plastic extrusion machines, oil and wax baths, colouring pots, hotplates, die, mould and press tool heaters.

Furzehill Laboratories, Ltd., Boreham Wood, Herts. **C.18.**—Three d.c. coupled cathode ray oscilloscopes are seen working. Cameras for use with this apparatus are also



Furzehill 1684 D/2 oscilloscope

shown, together with sensitive valve voltmeters, stabilized power supply units, portable frequency standards, beat-frequency oscillators, audio-frequency attenuators and high dissipation resistance boxes.

Garrard Engineering & Manufacturing Co., Ltd., Newcastle Street, Swindon. **G.26.**—A new marine type radiogram is shown playing a record while undergoing a rolling motion as if at sea.

G. B. Equipments, Ltd., 80-82, Regent Street, London, W.1. **C.69.**—Bell & Howell-Gaumont 16mm sound and silent film projectors, light and sound change-over units, microphones, etc.

Gestetner, Ltd., Aldwych, London, W.C.2. **E.73.**—Electric duplicators.

Grimshaw, Baxter & J. J. Elliott, Ltd., 29-37, Goswell Road, London, E.C.1. **H.501 and H.551.**—Electric clocks.

Guy, Morrison & Co., Ltd., 3, Bayley Street, London, W.C.1. **H.253.**—The "Buk" electric dry shaver.

Hadley Sound Equipments, 587-589, Bearwood Road, Smethwick. **G.22.**—The "Multicom" is claimed to be the only equipment of its kind existing that provides loudspeaking inter-communication between all points at the touch of a switch. The office type inter-communicator gives direct two-way loudspeaking communication with selected personnel and also embodies a radio set, while the new radio marine inter-communicator besides providing radio reception for weather forecasts and recreation, with loudspeaking communication between all parts of the ship, can also be used for loud-hailing. An industrial sound unit provides for staff location, departmental messages, music for the workers, alarm signals, etc.

Hale Electric Co., Ltd., Talbot Road, London, W.13. **G.30.**—Besides vacuum cleaners, there is on show a new band-spread table model radio receiver.

Hanovia, Ltd., Bath Road, Slough. **C.35.**—Ultra-violet radiation equipment; fluorescence analysis laboratory lamps; "Alpine Sun," "Centrosol" and "Kromayer" medical lamps; air sanitation discharge tubes and "Sollux" infra-red lamps.

Hawk, Ltd., Treforest. **K.134.**—"Trehawk" focus torch cases, hand lamps, cycle dynamo lighting sets, etc.

Heala (Electro-Medical), Ltd., 13B, High Road, London, N.W.6. **C.128.**—Infra-red lamps.

Hilger & Watts, 48, Addington Square, London, S.E.5. **C.3.**—Among the instruments exhibited are spectrographs, spectrometers, polarimeters, absorptiometers, photo-electric instruments, and colorimeters.

H. C. Hiscock, 153, King's Road, London, S.W.3. **K.117.**—Table, standard and desk lamps include standards made of glass.

Oswald Hollmann, 208, Kent House Road, Beckenham. **K.80.**—Lighting fittings.

Hoover, Ltd., Perivale. **Earls Court, W.1.**—The new model 612 vacuum cleaner is easier to empty and has broader "dirt-finder" light and improved cleaning tool container than previous models. No kitchen is too small for the company's compact washing machine.

R. F. Hunter, Ltd., 51, Gray's Inn Road, London, W.C.1. **C.75.**—The "Mega-Flash" electronic lighting unit is of special interest among a range of photographic equipment, which includes various other studio lighting units, projectors, viewers and enlargers.

Hyders, Ltd., The Ironworks, Plaxtol, Kent. **K.20.**—Wrought-iron lighting fittings.

Alfred Imhof, Ltd., 112-116, New Oxford Street, London, W.C.1. **G.28.**—Domestic refrigerators and frozen food conservator cabinets.

Imperial Chemical Industries, Ltd., (Plastics Division), Black Fan Road, Wel-

wyn Garden City. **Earls Court X21 and X.34.**—A new plastic, "Fluon," possesses extreme chemical inertness and solvent-resistance, excellent electrical properties, and good mechanical properties at high temperatures. It remains flexible down to about 70 deg. C. and does not melt below 327 deg. C. A shock moulding unit is demonstrated making "Perspex" mouldings for bulkhead and lighthouse lighting units.

Insulators, Ltd., Leopold Road, London, N.18. **Earls Court X.47.**—Plastic mouldings.

Jaffe, Rose & Co., Ltd., 29-30, Holborn Viaduct, London, E.C.1. **K.69.** — Table lamps and shades.

E. & R. Jarvis, Ltd., 13-15, Bath Street, London, E.C.1. **K.55.**—Lighting fittings and shades.

Johnson, Matthey & Co., Ltd., Hatton Garden, London, E.C.1. **H.401.**—See Birmingham Section.

Kamm & Co., Ltd., 118, Fleet Street, London, E.C.4. **C.72.** — Cinematograph equipment, scientific and electrical instruments.

Kego Electric Co., Ltd., Mount Pleasant, Wembley. **K.130.**—The main feature of a new range of 2-, 3- and 4- and 5-light fittings is the internal suspension of the glass dishes which eliminates all shadows.

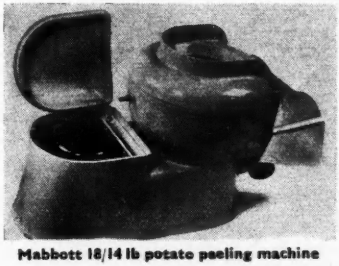
Walter Lambert, Ltd., 7, Glamis Street, Bognor Regis. **K.63.**—"Exquisart" lampshades.

W. J. Lamkin, Ltd., Gresham House, Kings Road, Brighton, 1. **Earls Court V.69.**—Lighting fittings.

La Reine Hair Waver & Curler Co. (1936), Ltd., 106, Upper Tooting Road, London, S.W.17. **D.48.** — Sterilizers and radiant heat lamps.

Lee Products (Great Britain), Ltd., 48, East Street, Brighton. **G.50.** — Radio apparatus.

Mabbott & Co., Ltd., Phœnix Works, Poland Street, Manchester, 4. **Earls Court T.8.** — Of special interest are three new



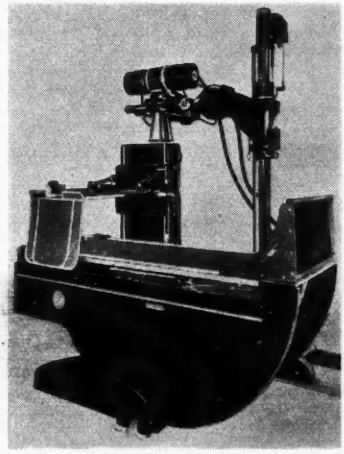
Mabbott 18/14 lb potato peeling machine

potato peeling machines, electrically heated "Thermo" food conveyors and hotclosets.

Magneta Time Co., Ltd., Goblin Works, Leatherhead. **E.40/48, G.54 and H.553.**—See British Vacuum Cleaner Engineering Co., Ltd.

Maple & Co., Ltd., Tottenham Court Road, London, W.1. **Earls Court P.14.**—Illuminated fluorescent directional signs.

Marconi Instruments, Ltd., St. Albans. **C.6 and C.21.**—X-ray and electro-medical



Marconi X-ray tilt table and tube stand

apparatus shown on stand C.6 include an electro-encephalograph diathermy equipment, an X-ray dosemeter and an audiometer for determining the degree of deafness. Among exhibits on stand C.21 are various instruments used in telephone, radio and television work; a universal bridge; moisture meters; a conductance meter TF 721B; a "Varistrobe" mains operated stroboscope; a thickness meter for determining thickness of plating or paint; an electronic counter a conductivity recorder; precision frequency measuring equipment and pH meters.

Marglass Co., 28, Cannon Street, Birmingham, 2. **Earls Court Q.718.**—Woven glass fabrics as supplied for impregnating with insulating varnish or for backing with mica for cutting into tape form.

J. & A. Margolin, Ltd., 112-116, Old Street, London, E.C.1. **G.23.**—A feature of the "Eric" radiogramophone unit is that by means of a simple switch, variable speeds for the playing of the microgroove records can be obtained.

Measuring Instruments (Pullin), Ltd., Winchester Street, London, W.3. **C.31.**—Miniature and industrial switchboard and portable ammeters, voltmeters and watt-

meters; frequency meters; laboratory standards; pyrometers; ratiometers; galvanometers; radio service test sets; the "C. & R." bridge and an electronic ohmmeter.

Megatron, Ltd., 115a, Fonthill Road, London, N.4. **C.40.** — Mounted and unmounted selenium photo-electric cells for light meters, photo exposure meters, smoke detectors, and scientific instruments include the new extra-sensitive "B" units.

Mellor Mineral Mills, Ltd., Etruria Vale, Stoke-on-Trent. **B.38.**—Electrical porcelain.

Mentmore Manufacturing Co., Ltd., Station Road, London, N.22. **Earls Court X.46.** — Injection mouldings of electrical accessories.

Metamec, Ltd., Dereham, Norfolk. **H.556.**—Electric clocks.

Mica Products, Ltd., 1, Downs Park Rd., London, E.8. **Earls Court X.37.**—Compression and injection mouldings, bobbins and formers, plastic mica and "Micanite" insulating components.

Ministry of Supply, Shell Mex House, London, W.C.2. **C.20 and C.39.**—The production, measurement and application of radio-active isotopes to industry, medicine and research is the theme of this exhibit, the centrepiece of which is the original apparatus used by Cockcroft for splitting the atom and a model of the graphite low energy experimental pile at Harwell.

Moulded Products, Ltd., Chester Rd., Birmingham, 24. **Earls Court X.45.**—Plastic mouldings for the electrical trade.

Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2. **G.17.**—Outstanding electronic instruments are a direct reading viscometer, a commercial ultrasonic generator, a cathode ray oscillograph for the l.f. ranges and a conductivity bridge. Radio receivers include three models for the export market only. One, the "Double Super," incorporating a double superheterodyne circuit, has each of the eight important short-wave bands spread across the whole width of the dial. Exhibits in the amplifier section include microphones, microphone stands, loudspeakers and a 10 W bi-tone loudspeaker combination Miniature thyratrons for welding, industrial timing, control power switching, etc.; a 1,000-joule tube for commercial photography and numerous industrial applications; and the first of a new series of hard glass v.h.f. valves, are new industrial valves shown. Miniature valves are prominent among domestic types.

Nalder Bros. & Thompson, Ltd., 97, Dalston Lane, London, E.8. **C.102.**—Square and round pattern instruments in the flush and projection patterns, comprise ammeters, voltmeters, wattmeters, synchroscopes, power factor meters and frequency meters. Portable instruments, recording instruments and protective relays are also on show, as well as miniature circuit breakers. Among new designs is a complete range of long scale instruments, and an indicating measuring instrument, the "Vectormeter," which indicates simultaneously readings of kilowatts, kVAr, power factor and amperes.

New Welbeck, Ltd., 94, New Bedford Road, Luton. **Earls Court W.8.**—The "Senior" model machine, besides acting as a powerful industrial type vacuum cleaner, can also be adapted for supplying relatively large quantities of air for spraying, hot-air drying, etc.

Office Machinery, Ltd., 3, Vere Street, London, W.1. **B.52.**—The "Omalite" desk lamp incorporates a 12in "warm white" fluorescent tube and has an adjustable reflector.

"Ossicaide," 1, Upper Richmond Road, London, S.W.15. **C.112.** — Two new models, the RP 11 and 12, incorporate inductive pick-up units which enable deaf persons to hear satisfactorily on the telephone, or in cinemas, etc., whilst not interfering with the effectiveness of the instruments as hearing aids. These instruments, supplied with either miniature or large air conduction earpieces or an unobtrusive bone conductor, weigh less than 9oz, including batteries and earpiece.

A. L. Parker Co., Ltd., 4, Castle Court, London, E.C.3. **G.19.**—The "Phantom" press-button switch, the "Minicomm" intercom-radio, car radio and amplifiers.

Peerless & Ericsson, Ltd., 6, Lygon Place, London, S.W.1. **Earls Court T.7 and T.14.**—Electrical food preparation equipment includes mixers, mincers, sausage fillers, potato peelers, chippers, dishwashers, coffee grinders and pie machines.

Phototechnics, Ltd., 7, Pratt Walk, London, S.E.11. **C.84.**—Electronic photographic apparatus, including the "Megaflash" gun, and recording equipment.

Pifco, Ltd., Watling Street, Manchester, 4. **C.107.**—Accompanying the Pifco electrical vibratory massager is a new electric heat massager and a radiant-heat and infra-red apparatus. The "Dualite" lantern combining an 800ft penetrating beam and a broad floodlight, a pen torch and an adjustable table lamp are other products.

Pilot Radio, Ltd., 31-37, Park Royal Rd., London, N.W.10. **G.24.**—Radio apparatus includes special export models.

Plessey International, Ltd., Ilford. **G.29.**—The "Breeze" pre-formed wiring system, with the aid of plugs and sockets, enables sections of pre-formed wiring to be readily assembled, and for maintenance purposes

detached. Cables can also be taken direct from junction or terminal boxes using simple ferrule assemblies designed for the purpose. The method of coding enables an entire circuit to be instantly traced. Radio and television components, an automatic record changer and a press-button single record player are also shown.

Raymond Electric, Ltd., 26, Wadsworth Road, Perivale, **G.48.**—Radio and television components.

Rees-Mace Mfg. Co., Ltd., 740, High Rd., London, N.17. **G.54.** — Radio apparatus.

Regentone Products, Ltd., Eastern Ave., Romford. **G.20.**—New automatic radiograms and television sets.

Rejafix, Ltd., 75, Baker St., London, W.1. **D.57.** — Marking and printing machines.

Rollnick & Gordon, Ltd., Empire Way, Wembley. **Earls Court W.3.**—See Birmingham Section.

Romac Radio Co., Ltd., The Hyde, London, N.W.9. **G.52.**—Among radio sets are portable and car types.

Sangamo Weston, Ltd., Great Cambridge Road, Enfield. **C.117.**—See Birmingham Section.

Philip S. Schulman, Ltd., 72-78, Victoria Road, Manchester, 14. **K.84.**—"Philora" lampshades and lighting fittings.

Scientific Instrument Manufacturers' Association of Great Britain, Ltd., 26, Russell Square, London, W.C.1. **C.20 and C.39.**—The whole range of scientific instruments and laboratory apparatus is covered by the ninety-five members of this Association. An atomic central exhibit has been arranged by the Ministry of Supply (q.v.)

Sheffield Smelting Co., Ltd., Royds Mill Street, Sheffield, 4. **H.404.** — Contacts, thermocouples, etc.

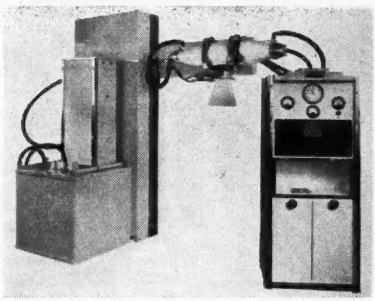
E. Shipton & Co., Ltd., Ferndown, Northwood Hills, Middlesex. **E.56.**—The new "Intercall" telephones are supplied either in pairs or for the 5-way system. Switchboards are available for hotels, clubs, etc. Other products are private automatic telephone systems, loudspeaking telephones, press-button wall and desk telephones, staff-locating systems, executive indicators and polarized relays.

Short & Mason, Ltd., Macdonald Road, London, E.17. **C.1.**—Indicators, recorders and controllers for temperature, pressure, humidity, time, flow and liquid level.

Simon Sound Service, 48-50, George Street, London, W.1. **G.31.**—Recording equipment.

Smiths English Clocks, Ltd., Waterloo Road, London, N.W.2. **H.501 and H.551.**—Among "Sectric" wall and mantel clocks are an automatic alarm clock, with week-end cut-out, and Westminster chime clocks.

Solus-Schall, Ltd., 18, New Cavendish Street, London, W.1. **C.10.**—A new deep-therapy unit is of special interest. Among X-ray apparatus for medical and industrial



Solus-Schall 200 kV constant potential deep therapy apparatus

work are mobile and portable ship-weld crystal analysis, and dental units.

Southern Instruments, Ltd., Fernhill, Hawley, Camberley, Surrey. **C.38.**—"Mini-rack" cathode ray oscillograph recording equipments, amplifiers and apparatus for measuring pressure, force, strain, vibration and acceleration; also transient recorders.

Speights, Ltd., Mill Road, Dewsbury. **K.111.**—Wrought-iron lighting fittings and "Classic" lamps and shades.

Stadium, Ltd., 30-36, Queensway, Ponders End. **K.126.**—Handlamps.

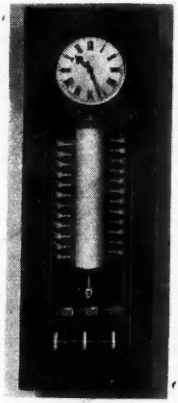
Streetly Manufacturing Co., Ltd., 1, Argyll Street, London, W.1. **Earls Court X.38.** — Prominent among mouldings in urea, melamine, phenolic and thermo-plastic materials is a selection of lamp shades.

Suflex, Ltd., 35, Baker Street, London, W.1. **G.25.**—Wires and sleevings.

Surgical Equipment Supplies, Ltd., Westfields Road, London, W.3. **C.115.**—Two new sterilizers have been designed for the dental profession. One is jacketed entirely in plastic with an automatic cut-out and pilot light, the other is a molten metal and oil sterilizer. The "Surqual" hot-air sterilizer, thermostatically controlled from 93 deg to 260 deg C., can be supplied with a table stand. The low-priced "Minimatic" instrument sterilizer incorporates a cut-out, pilot light and removable tray.

Synchronome Co., Ltd., Mount Pleasant, Alperton, Middlesex. **H.601.**—The new "Mis-pulse" tell-tale watchman's clock is designed so that unless all recording stations are visited during a definite period in a definite sequence an alarm bell is sounded. The sequence is easily changed and a selector device is provided for week-end or other abnormal operation. The whole apparatus

operates from an electrical impulse master clock. Also of special interest is the "Synchronome-Shortt" free pendulum and slave

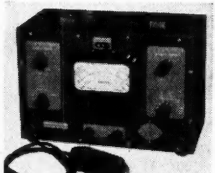


Synchronome watchman's tell-tale clock

for observatory time installations, programme controllers, time recorders and an electric turret striking clock.

Tenaplas, Ltd., 78, Buckingham Gate, London, S.W.1. **Earls Court X.1.**—P.v.c. and polythene extrusions include "Tenawire" (cables) and "Tenatherm" (electric soil heaters).

Taylor Electrical Instruments, Ltd., 419/424, Montrose Avenue, Slough. **G.15.**—As the design of the "Windsor" model 170A electronic testmeter is based on a d.c. valve voltmeter used under conditions of cathode feedback, the accuracy of the instrument is largely independent of valve



"Windsor" electronic testmeter

changes. A special feature is the absence of zero drift.

Thermionic Products, Ltd., Morris House, Jermyn Street, London, S.W.1. **E.66.**—The "Recordon" office dictating unit employs sensitized paper discs which can be folded and posted.

Thermo-Plastics, Ltd., Dunstable. **Earls Court, X.51.**—Batteries, lighting fittings, refrigerator equipment and radio cabinets.

T-Lampshades, 151, Park Lane, Leeds, 1. **K.45.**—Lampshades, pottery lamps, table and floor standards.

T.M.C.-Harwell (Sales), Ltd., 37, Upper Berkeley Street, London, W.1. **H.602.**—"Temco" electric clocks in moulded and wooden cases, chromium and glass.

J. W. Towers & Co., Ltd., Victoria House, Widnes. **C.28.**—Laboratory equipment includes electric ovens and incubators.

Trix Electrical Co., Ltd., 1, Maple Place, London, W.1. **G.2.**—A portable battery-operated public address system less than 1ft cube and weighing only 25½lb has an output of approximately 5 W.

Two-Way Talkie, Ltd., Neltic House, Charteris Road, London, N.4. **E.13.**—Battery-operated intercommunication equipment in 2, 3 and 4-way versions.

Ultra Electric, Ltd., Western Avenue, London, W.3. **G.16.**—Radio and television apparatus.

Unicam Instruments (Cambridge), Ltd., Arbury Rd., Cambridge. **C.27.**—Galvanometers, pH meters, spectrophotometers and instruments for X-ray analysis

Universal Plastics, Ltd., Brook Rd., London, N.22. **Earls Court X.48.**—Mouldings.

Vactric, Ltd., Newhouse, Motherwell. **Earls Court W.4.**—Vacuum cleaners, floor polishers and fractional-h.p. motors.

Victoria Instruments (V.I.C. (Bournemouth), Ltd.), Midland Terrace, Victoria Road, London, N.W.10. **C.52.**—A moving-coil meter is fitted with a device which automatically short circuits the instrument coil when overloaded. Contact meters in 4in rectangular cases have two adjustable contacts for minimum and maximum voltage. A double pivoted galvanometer of moving coil type for d.c. is free from vibration.

Viscose Development, Ltd., Woldham Road, Bromley, Kent. **D.19.**—"Viskring" cable markers.

Waite & Son, Ltd., Bond Rd., Mitcham. **K.16.**—Lighting fittings and shades.

Warm-Glow Co., Ltd., 1133, London Rd., Leigh-on-Sea. **C.125.**—A display of ancient bed-warming appliances accentuates the modern way of warming by means of the Model B electric blanket demonstrated. The use of a new water-acid-and alkali-proof and non-ageing heating element, with totally enclosed solid moulded terminal anchorage, enables the electric blanket to be laundered at home. A new polythene-insulated soil-heating cable is also shown.

Water Softener & Vacuum Cleaner Service, Ltd., 248, Romford Road, London, E.7. **Earls Court W.7.**—The "Jifextra"

"Jifextra vacuum cleaner

electric cleaner incorporates a metal canister to collect the dust.

Whiteley Electrical Radio Co., Ltd., Victoria St., Mansfield. **G.55.**—Loudspeakers, radio components and radio sonde.

Overseas Electrical Trade

RECORD EXPORTS DURING THE FIRST QUARTER OF 1949

THOUGH £632,844 below January's record figure, electrical goods and machinery exports during March at £10,784,608 are easily the second best result, being £1,127,569 above the previous next highest figure recorded last November. They were over £3 million more than in the corresponding month last year. For the first quarter of the year the total electrical exports amounted to no less than £31,715,739, which compares with £23,172,945 for the corresponding period of 1948.

Exports of electrical goods and apparatus during the three-month period were valued at £20,576,622, which was £4,617,411 more than for January-March, 1948. The biggest customer was South Africa who took goods to the value of £2,960,871, almost exactly £1 million more than in the corresponding period of 1948. India was a close second with £2,731,389 (£1,457,215), Pakistan taking in addition £319,448 (£32,915). Australia increased her purchases from £1,356,724 to £2,136,547, while New Zealand also bought rather more—£1,013,817, instead of £856,170.

The market for British electrical goods continues to expand in Egypt (from £417,175 to £583,534), the Netherlands from £376,707 to £485,094), Russia (from £58,829 to £219,152), Finland (from £87,939 to £102,234), Norway (from £335,079 to £426,628), Poland (from £47,033 to £174,305), Denmark (from £135,473 to £272,434), Czechoslovakia (from £75,182 to £131,595) and Greece (from £97,235 to £160,641), but there were substantial declines in shipments to Turkey (from £380,903 to £245,137), Sweden (from £638,784 to £519,560), Palestine (from £190,010 to £72,201), Iraq (from £292,126 to £186,962), China (from £447,060 to £37,712) and Brazil (from £309,743 to £211,013).

TABLE I.—ELECTRICAL EXPORTS

Class	Mar., 1949	Mar., 1948	Class	Mar., 1949	Mar., 1948
	£	£		£	£
Telegraph and telephone wires and cables (submarine) ...	30,255	2,441	Parts and accessories of cooking and heating appliances	37,939	32,820
Ditto, not submarine	651,963	503,309	Commercial electrical instruments	109,440	83,367
Wires and cables, rubber insulated	484,639	369,131	House service meters	152,075	144,032
Ditto, cotton, silk or artificial silk insulated	100,849	75,720	Time recorders and time switches	8,937	4,227
Ditto, enamel, glass or asbestos insulated	105,951	20,372	Other electrical instruments ...	82,357	75,855
Ditto, paper insulated ...	771,851	541,284	Electro-medical apparatus (not X-ray)	48,265	26,876
Ditto, other	90,344	91,068	X-ray apparatus, tubes and parts	63,490	37,695
Commercial radio apparatus ...	306,579	330,977	Permanent magnets	11,998	17,933
Domestic radio apparatus ...	351,869	243,069	Insulating cloth and tape ...	69,118	42,697
Telegraph, telephone and signalling apparatus	1,250,729	736,734	Other insulating materials ...	86,261	86,426
Radio loudspeakers	27,800	9,299	Unclassified goods and apparatus	480,789	283,733
Sound reproducing apparatus components and parts, other than cinematograph apparatus	254,000	227,292	Generators, up to 200 kW	589,897	271,409
Other radio, etc., apparatus ...	59,950	45,698	Ditto, over 200 kW	292,799	132,625
Radio valves	185,215	202,416	Ditto, parts	126,022	325,050
Electric lighting carbons ...	11,902	3,434	Motors, railway and tramway...	23,938	16,589
Lamps, not exceeding 24 V ...	37,918	18,713	Ditto, other, up to ½ h.p. ...	109,897	48,160
Discharge lamps	24,360	29,316	Ditto, from ½ to 1 h.p. ...	59,941	42,633
Other lamps	75,522	97,628	Ditto, from 1 to 250 h.p. ...	554,219	306,647
Other lighting apparatus ...	462,021	352,616	Ditto, over 250 h.p.	87,490	69,442
Primary batteries	72,786	46,089	Ditto, parts	62,161	48,011
Accumulators for motor vehicles	164,461	163,278	Converting machinery ...	5,364	3,412
Ditto, traction	18,197	10,806	Transformers, including coils ...	464,725	346,149
Ditto, radio	1,569	5,432	Rectifiers for power-house use...	17,084	27,273
Other portable accumulators ...	15,247	20,471	Motor starting and control gear	173,925	120,586
All other accumulators ...	36,922	43,253	Switchgear and switchboards (not telegraph or telephone)	771,448	497,119
Parts and accessories	90,493	39,835	Other electrical machinery ...	32,908	38,969
Cooking appliances	146,924	144,066	Vacuum cleaners and parts ...	223,213	113,702
Heating appliances	102,989	63,139	Other electrically operated portable appliances	74,538	41,453
Flat irons	31,075	42,422	Tota	10,784,608	7,764,198

Of the £3,324,451 worth of generating plant exported during the past quarter (the figure compares with £1,950,807 for January-March, 1948) Russia accounted for just over £1 million. Shipments of electric motors increased from £1,542,754 to £2,775,558. India took £524,192 worth (£298,158), Australia £446,937 (£95,826), South Africa £327,204 (£217,719), Holland £166,610 (£86,628) and Denmark £117,133 (£15,963). South Africa and India each purchased £774,000 worth of "other electrical machinery."

Electrical imports during March showed a decline of over £100,000 compared with March, 1948 (£268,456 instead of £375,083). Electrical goods and apparatus imports were slightly lower (£204,052, compared with £235,031), but only £5,800 worth of generators were bought, compared with £83,656 in March last year.

The past quarter's figure for all electrical imports was £846,724, which is £27,513 less than in the corresponding period of last year. The United States provided £210,403 (£302,564) of the £648,312 (£622,123) worth of electrical goods and apparatus coming into this country. While over the three months purchases of generators fell from £300,284 to £33,218, rather more motors were bought, £114,030 worth instead of £104,224.

TABLE II.—Distribution of Electrical Goods and Apparatus

Destination	Mar., 1949	Mar., 1948
	£	£
Eire	216,939	270,137
Channel Islands...	28,711	30,380
Malta and Gozo	24,337	5,638
Cyprus	10,490	29,961
British West Africa	125,519	81,170
Union of South Africa	962,697	547,974
Northern Rhodesia	23,083	6,114
Southern Rhodesia	150,040	81,613
British East Africa	104,019	108,151
Bahrein, Kowit Qatar and Trucial Oman	56,027	37,007
India	873,572	304,716
Pakistan	130,674	10,569
Malaya	229,503	196,420
Ceylon	61,607	68,018
Hong Kong	198,944	95,220
Australia...	824,886	359,231
New Zealand	336,156	256,473
Canada	59,542	80,321
British West Indies	103,579	87,229
Anglo-Egyptian Sudan... ...	61,906	30,306
Other British Countries ...	87,378	56,678
Soviet Union	37,889	23,267
Finland	34,223	36,429
Sweden	255,671	145,987
Norway	119,591	101,647
Iceland	23,016	5,435
Denmark	88,388	32,603
Poland	105,453	21,313
Germany...	10,397	3,842
Netherlands	138,526	122,469
Belgium	92,314	76,183
France	76,648	45,322
Switzerland	22,240	35,502
Portugal	158,076	100,161
Spain	42,704	63,073
Austria	22,602	8,350
Hungary	6,605	22,252
Czechoslovakia	70,482	28,143
Yugoslavia	12,900	19,643
Greece	27,885	20,199
Turkey	53,581	113,446
Dutch East Indies	31,300	28,506
Dutch West India Islands ...	9,247	6,251
Portuguese East India ...	7,528	41,702
Syria	48,736	9,370
Lebanon	69,500	6,912
Palestine	23,987	59,159
Egypt	222,990	232,718
Iraq	62,523	90,043
Iran	7[illegible]521	104,586
Burma	[illegible]930	85,861
China	16,156	261,269
United States of America ...	28,209	26,796
Mexico	29,031	3,362
Colombia	9,184	13,971
Venezuela	63,699	73,671
Chile	14,343	21,808
Brazil	74,630	125,360
Uruguay	25,205	18,535
Argentine Republic	106,341	244,627
Other Foreign Countries ...	108,179	91,870
Tota	7,115,039	5,314,969

NEW BOOKS

Watch Escapements. By Dr. J. C. Pellaton. Translated into English by S. Paris and edited by D. de Carle. Pp. 126+xxiii; figs. 268. N.A.G. Press, Ltd., 226, Latymer Court, Hammersmith, London, W.6. Price 10s 6d.

This book is a translation of one which has been used for many years as a textbook in Swiss schools of horology, the author having been a teacher at Le Locle. It is divided into four main parts which treat of the lever, pin pallet, cylinder and detent escapements, describing their various features of design, operational characteristics and the kinds of faults they may develop in service. By using drawings some 20 diameters or so larger than actual size, the author emphasizes the importance of particular points. This important and authoritative work will no doubt be of great use to all those who are concerned either with teaching the theory and design of escapements or with their manufacture and maintenance.—R. P.

Palmer's Private Companies. By J. Charlesworth. Forty-first edition. Pp. 102; index. Stevens & Sons, Ltd., 119-120, Chancery Lane, London, W.C.2. Price 3s

Hardfacing by Welding. By M. Riddihough, M.Met., A.R.I.C.,, F.I.M.. Pp. 127; illus. The Louis Cassier Co., Ltd., Dorset House, Stamford Street, London, S.E.1. Price 8s 6d (postage 4d).

COMMERCE and INDUSTRY

B.E.A. Exhibition : Sales Management Conference

ON 21st April, the Minister of Fuel and Power (Mr. Gaitskell) opened the "More Power and What it Means" Exhibition at the B.E.A. headquarters, Great Portland Street, W.1, which was referred to in our last week's issue. In a brief speech Mr. Gaitskell referred to the prospects of increased generating capacity and said that the exhibition would give the informed visitor a good idea of the vast amount of work involved in the building of a power station. Lord Citrine, chairman of the B.E.A., also spoke and thanked Messrs. Mather & Crowther who were responsible for the display.

Visitors to the exhibition are handed a copiously illustrated booklet setting forth in simple terms the need for more and more plant, and outlining the various stages in constructing a power station, from site clearing to completion. Another very instructive booklet "How Electricity is Made" is also available at the exhibition and should prove of great value in imparting an understanding of the mysteries to students and other visitors.

E.R.P. Engineers' American Visit

On 6th April twenty-six electrical and mechanical engineers from nine European E.R.P. countries left Paris for the United States to study American interconnected power systems. The visit has been arranged by the Productivity Council and the engineers represent France, Belgium, Luxembourg, Netherlands, Austria, Italy, Western Germany, Switzerland and Great Britain. The British representatives are Mr. G. R. Petersen, overseas liaison officer of the British Electricity Authority, and Mr. J. A. Vice, generation (operation) engineer to the Authority

E.D.A. Sales Management Conference

The 1949 Sales Management Conference organized by the British Electrical Development Association will be held at Caxton Hall, Westminster, S.W.1, from 24th to 27th May next. The Conference will be opened by Sir Henry Self (deputy chairman, British Electricity Authority), and contributions will be made by Messrs. J. H. Addenbrook and A. G. F. Pallister (Midlands Electricity Board), C. H. A. Collyns (S.E. Scotland Electricity Board), A. W. Bonell (London Electricity Board), C. H. Hardie (Eastern Electricity Board), J. I. Bernard (E.D.A.), and R. Harvey (E.D.A).

Water Heating Comparisons

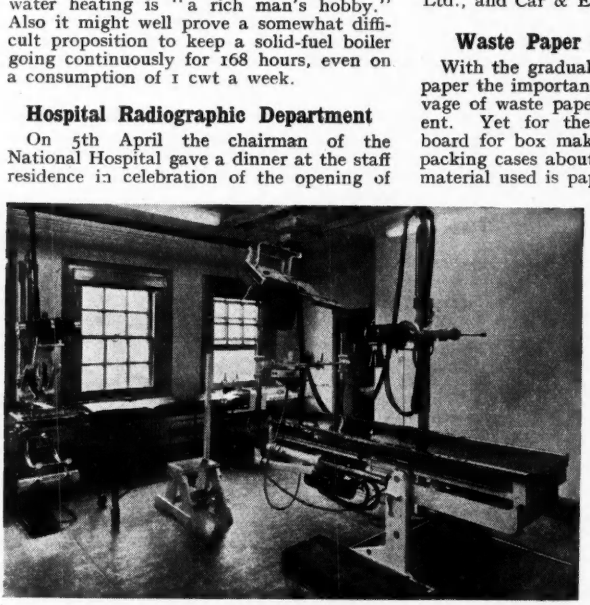
An interesting comparison of water heating by electricity and solid fuel was given recently by Mr. R. Grierson, Eastern Electricity Board, to the London and Eastern Joint Area E.D.A. sales lecture meetings at London and Cambridge. Based on the standard hot-water storage temperature of 140 deg F, a cold supply of 64 deg F and an overall weekly thermal efficiency of 85 per cent during the summer, the weekly consumption of hot water in the average Government-sponsored dwelling occupied by

Engineers leaving Paris for the United States where they will study American power systems

a family of two adults and two children is said to range from 160 gal to 250 gal, with an electricity consumption of 42 to 65.5 kWh. With electricity at ¾d per kWh the cost per dwelling is from 2s 7½d to 4s 1d per week, representing an additional consumption of low-grade fuel at the power station of from 59 lb to 91.5 lb. As the present price of boiler fuel is between 4s 6d and 6s per cwt, the author says it would appear somewhat difficult for anyone seriously to maintain that efficient electric hot-water heating is "a rich man's hobby." Also it might well prove a somewhat difficult proposition to keep a solid-fuel boiler going continuously for 168 hours, even on a consumption of 1 cwt a week.

Hospital Radiographic Department

On 5th April the chairman of the National Hospital gave a dinner at the staff residence in celebration of the opening of



X-ray room at the National Hospital showing a Philips tilting couch

a new Radiographic Department on the third floor of the building in Queen Square, London, W.C.1. Among the guests who were present were Dr. S. Cochrane Shanks, consultant adviser in radiology to the Ministry of Health, and Dr. C. Teall, president of the Faculty of Radiologists. The occasion marked the culmination of many years' work on the project. Four main X-ray generators have been installed by Philips Electrical, Ltd., consisting of four DX4 500 mA units, two US5 motor-driven tilting couches fitted with explorators and Mullard rotating anode tubes and auxiliary equipment. Four skull tables were supplied by Mr. G. Shönander, of Stockholm, Sweden. In a speech after dinner, Dr. Erik Lindgren paid tribute to the late Dr. Erik Lysholm, the prominent Stockholm neuro-radiologist, who planned and designed the layout of the new radiographic floor.

Medway Industries Exhibition

The Medway towns are holding a joint industrial exhibition from 21st to 28th May at Fort Horsted, Rochester. Among the exhibitors will be the South Eastern Electricity Board, Omega Products, Ozonair, Ltd., and Car & Electrical Services, Ltd.

Waste Paper for Board Making

With the gradually improving supplies of paper the importance of continuing the salvage of waste paper may not be so apparent. Yet for the manufacture of paper board for box making and fibre board for packing cases about 90 per cent of the raw material used is paper waste. This applied even before the war, and is essential if prices of the finished products are to be kept down in order to compete with those of other countries. Incidentally, even in countries where wood pulp is plentiful a high percentage of paper waste is employed.

Pre-war usage of salvaged waste paper and cardboard amounted to 666,000 tons; last year it was 750,000 tons. By far the largest user is the Thames Board Mills, which with its eight boardmaking machines at Purfleet and Warrington has a total capacity of finished board amounting to 8,000 tons a week. The mills at Purfleet are the largest in the British Empire and include the largest boardmaking machine in the country. With a capacity of 2,000 tons of board a week, this machine, when installed in 1933, was the largest in the world, but it now has a rival in America.

Old Centralians

The Midland Branch of the "Old Centralians" Association is holding its annual reunion and dinner on 6th May at the New Imperial Hotel, Temple Street, Birmingham. Mr. A. A. Blanco, hon. branch secretary, 99, Middleton Hall Road, King's Norton, Birmingham, 30, will be glad to hear from old students of the City & Guilds En-

gineering College, South Kensington, who are resident in the Midlands.

Caroline Haslett Trust

In its third annual report the Caroline Haslett Trust Committee states that it confidently believes that the experimental period is over and that the past three years have established the Trust as a permanent and valuable feature of the educational work of the electrical industry. The Committee reports with satisfaction the success of the scholarship holders who are now in the electrical industry. The 1949 Travelling Exhibition has been awarded to Miss M. J. Gordon (whose thesis for her M.Sc degree was on the subject of electrical housecraft education, and who is continuing her study of this subject for her doctorate) to enable her to pursue her studies in the United States. Scholarship awards for the 1948-49 session were made to Miss H. M. Shepherd, National Training College of Domestic Subjects, London, and Miss W. Hicks, Domestic Science College, Leicester.

Ekco-Ensign South African Development

Ekco-Ensign Electric, Ltd., announces the conclusion of an agreement with African Incandescent Lamps (Pty.), Ltd., of Johannesburg, which provides for E. K. Cole, Ltd., to become a substantial shareholder in the South African company, and Ekco-Ensign Electric, Ltd., to contribute plant and technical information required for the manufacture of tungsten and fluorescent lamps, fittings and control gear. A new factory has recently been acquired at Industria, on the outskirts of Johannesburg, and is already in production.

Annual Holidays

The works of British Insulated Callender's Cables, Ltd., will be closed for the annual holidays during the following periods—Anchor Works, Leigh, 2nd to 9th July; Prescot, Helsby, Huyton & Melling Works, 23rd July to 1st August; Willenhall Foundry, 23rd July to 2nd August. Erith Works will not be closed as holidays will be staggered.

Stator for Pyrmont Station

Details of the plant to be installed at the new power station at Pyrmont, New South Wales, were published in our issue of 18th February last. The four 55,555 kVA, 33 kV turbo-generator sets are being supplied by the Metropolitan-Vickers Electrical Co., Ltd., and the condensers, l.p. heating apparatus and deaerators are being manufactured in Australia to Metropolitan-Vickers design. The turbines will operate at 1,200 lb/sq in, 925 deg F. The most recent part to be shipped by the company from this country is a generator stator weighing 106 tons, which is now aboard the s.s. *Kaimata* bound for Sydney ex Liverpool. This stator was transported by road from Trafford Park on a low-slung articulated trailer powered by two tractors each developing 740 h.p., one being at the rear to facilitate cornering. At the works the stator was lifted on to the trailer by two separately operated 70-ton cranes, the load being suspended from a lifting bar carried by two crane hooks. On arrival at Liverpool the stator was slung aboard by means of a mammoth floating crane. In the accompanying picture we show the stator *en route* to Liverpool docks.

Large Met.-Vick. stator for Pyrmont power station

Essex Sub-Area

The Essex Sub-Area headquarters of the Eastern Electricity Board are now at "Millfield," Bentley, nr. Brentwood, Essex (telephone: Coxtie Green 308), to which address all communications for the manager, engineer, secretarial and commercial officers should be forwarded. The Sub-Area accounting offices will continue at 83-

85, High Street, Brentwood, and all communications for the Sub-Area accountant should be addressed there.

Television Studio Lighting

Although working under lights as powerful as those used in film studios, television artists do not have the opportunity of resting between shots to recover from the effects of heat. Recently, however, two B.B.C. television studios at the Alexandra Palace have been equipped with a new type of discharge lamp that provides a steady and cool light with good colour-rendering properties. It is a development of the mercury-vapour lamp in which the addition of cadmium provides a more pleasing quality of light.

The lamps are used in special "Softlight" fittings which have been designed and developed by the General Electric Co., Ltd., in conjunction with the B.B.C. television engineers. They are designed to give indirect illumination, the light from the 2.5 kW lamp in each being redirected by reflectors and a refractor on to the matte-white inside surface of the housing, which forms the effective light source. Three of these fittings are mounted side by side in each studio, forming together a source of light 15 ft long by 4 ft wide.

The new lamps consume 7.5 kW per studio as against 4.8 kW when the tungsten lamps were used, but the illumination is increased by 75 per cent, while the heating effect has been reduced to negligible proportions.

Disclaimer

Eastwoods Electrical & Heating, Ltd., of 47, Belvedere Road, London, S.E.1, asks us to state that it has no connection with Eastwood Electrical Co. (Keighley), Ltd., which is being wound up.

Birmingham Electric Club

The Birmingham Electric Club has arranged a summer visit on 20th May to the City of Chester. Members will be the guests of Brookhirst Switchgear, Ltd., for lunch and will tour the company's works in the afternoon, followed by tea in the company's premises.

The Club is holding a golf competition meeting on 30th May at Edgbaston Golf Club.

Railway Signalling

With a view to increasing the services on the Uxbridge line, London Transport has installed a new signalling system between Rayners Lane and Uxbridge which will permit the passage of up to 30 trains per hour instead of 20 as was the case before. The work included the installation of a new cable post run throughout the line, the replacement of the existing track circuits by those of the condenser feed type, the provision of two-aspect colour light signals in place of the three-aspect ones previously employed, the erection of additional signals to improve the headway and the modernization of the circuits at the two intermediate signal cabins and at Hillingdon ground frame. The whole of the work was carried out at night without interference to traffic and was completed in approximately ten months.

Radio Component Manufacturers

At the annual meeting on 26th April of the Radio Component Manufacturers' Federation it was resolved to change the organization's title to "Radio and Electronic Component Manufacturers' Federation."

Trade Announcements

Compression Ignition, Ltd., announces that from 1st May it will take over all sales of its "Twiflex" couplings, which have hitherto been marketed by Flexaire, Ltd.

Wm. Don & Partners have moved to larger premises at Crown Works, Waddington's Yard, Crown Point Bridge, Leeds, where a sales counter has been opened and also a demonstration section for motors, control gear, switchgear, instruments, etc.

The National Electric Supplies Co., Ltd., of 13, Chiltern Street, Baker Street, London, W.1, has purchased the business of J. Swindells & Co., of 2, Park Road, Blackburn, and is continuing the business under the same title as a branch, under the management of Mr. G. Wilson, who asks for manufacturers' catalogues.

Catalogues and Lists

Electro Mechanical Manufacturing Co., Ltd., Scarborough, Yorks. — Technical brochure (No. Y.1) on unit-type industrial switchgear for all services up to 660 V.

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"Crowden" electric floor polishers (C. & G?)

"Phelan" sterilizers.

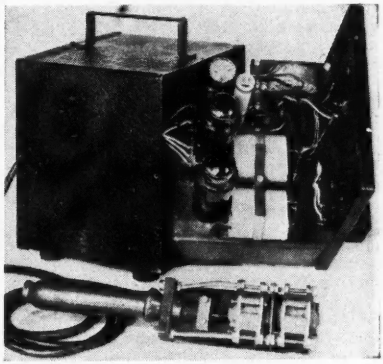
General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Electronic Aids to Production

Equipment in Use in the Manufacture of Electric Motors

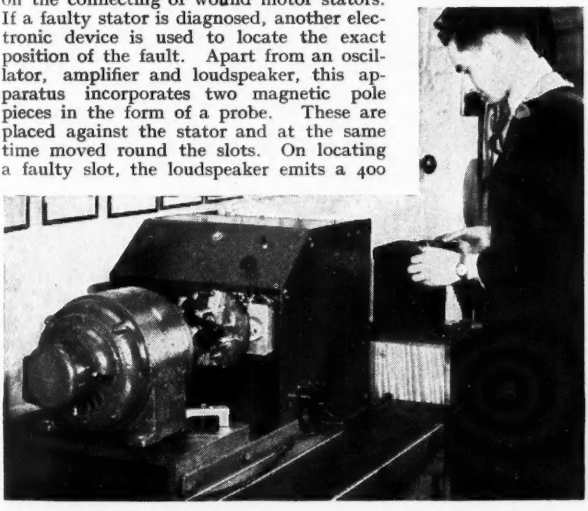
DURING the past few years progress in electronic engineering has been exceedingly rapid. The basic devices such as valves, cathode ray tubes and photoelectric cells have become increasingly useful for a diversity of industrial services. Higher standards of accuracy in component testing, and many tests which were impossible before the advent of electronics, have now been put within the range of the unskilled operator. As a result of this development the electronics department of Brook Motors, Ltd., has produced instruments for testing electric motors and sub-assemblies, together with protective equipment and counting devices.

One of the most useful instruments is the cathode ray oscilloscope, which is used for checking motor windings before fitting the rotor. A visual indication can be obtained of incorrect placing of coils or faulty connections. The 12in magnetically focused tube provides an immediate check, the screen being visible to several girls engaged on the connecting of wound motor stators. If a faulty stator is diagnosed, another electronic device is used to locate the exact position of the fault. Apart from an oscillator, amplifier and loudspeaker, this apparatus incorporates two magnetic pole pieces in the form of a probe. These are placed against the stator and at the same time moved round the slots. On locating a faulty slot, the loudspeaker emits a 400 c/s note which can be easily heard above the general factory noise. Before this device was introduced another form of "growler" was employed, the signal being supplied by a vibrating reed. It was not so compact or sensitive and was greatly inferior in operation.



Instrument for the audio indication of stator winding faults

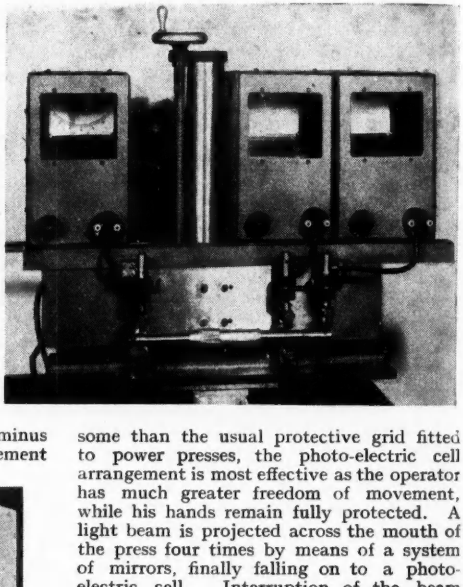
For research purposes, a cathode ray tube is used in conjunction with a transmission dynamometer for tracing speed - torque curves. By this method a tube with a blue screen and a long green afterglow traces the curve, the green trace remaining visible for 20-30 seconds, which is a useful feature where a more permanent record is not required. The horizontal and vertical deflecting coils of the tube are energized from d.c. amplifiers. Speed is traced horizontally, the amplifier concerned receiving at its input terminal the voltage from a tachometer generator coupled to the motor under test. Torque, which is traced vertically, is also expressed in terms of voltage by a specially designed transmission dynamometer. A flywheel ensures that any motor within the range of the equipment takes about ten seconds to reach full speed from



Torque-speed curve tracer

rest, during which time the speed torque curve is traced, permanent records being made photographically.

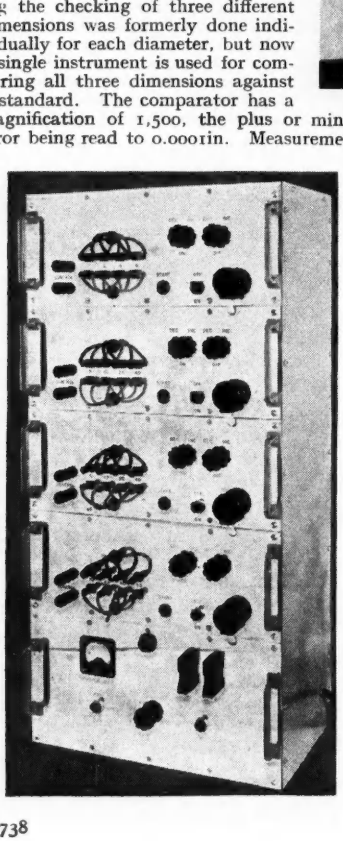
Samples of all products are life tested, which involves the starting and stopping of motors and control gear continuously at pre-set intervals. An electronic timer devised for this purpose permits four separate tests to be carried out simultaneously, the final switching being effected by relays, the contacts of which are rated at 2A 450V. The timing is accomplished by the condenser discharge method, and the time off (relay open) as well as the time on (relay closed) may be set to any period from one second to two minutes.



Comparator for checking three shaft diameters at once

Inspection of motor shafts involving the checking of three different dimensions was formerly done individually for each diameter, but now a single instrument is used for comparing all three dimensions against a standard. The comparator has a magnification of 1,500, the plus or minus error being read to 0.0001in. Measurement depends on small capacity changes in a radio frequency circuit, these changes being shown on a galvanometer calibrated in units of 0.0001in.

As a safety measure which is less cumbersome than the usual protective grid fitted to power presses, the photo-electric cell arrangement is most effective as the operator has much greater freedom of movement, while his hands remain fully protected. A light beam is projected across the mouth of the press four times by means of a system of mirrors, finally falling on to a photo-electric cell. Interruption of the beam stops the press instantly, and it cannot be restarted until the obstruction is withdrawn. If the protective system fails due to a faulty component, the circuit arrangement is such that the press will be stopped or prevented from starting. The photo-cell and relay control a compressed air valve which, in turn, controls an air-operated clutch coupling the motor-driven flywheel to the stroke. Time lag in operation is practically negligible.



Electronic timing device for testing motors and starters

Simpler applications of electronics such as photocell controls, counters and relay operated remote control devices have proved valuable aids in maintaining production efficiency in the factory under easier working conditions.

As it is likely that research on and the testing of electric motors and control gear will benefit from electronic development, a new laboratory has been built at the Brook factory where the possibilities of this field can be still further explored.

Electricity Supply

EXPERIMENTAL WIND-POWER STATION : HIRE OF DOMESTIC APPLIANCES

LAST July the Electrical Research Association began preliminary work on wind power research in Orkney, recording the wind speeds on the exposed north-west coast of the mainland. The North of Scotland Hydro-Electric Board is co-operating in this activity and has already made available for wind-power research a sum sufficient to meet the cost of the work in its area. The Board, in association with E.R.A., has now placed a contract with John Brown & Co., Ltd., for the design and construction of an experimental windmill in Orkney which will be the first of its kind in Britain. The diameter across the blades will be about 60ft and it will develop about 100 kW. The construction of the windmill is a further contribution by the Board to wind-power research, and also a contribution by John Brown & Co., since the cost to them will be greater than the contract price. The plant will operate in parallel with the diesel station at Kirkwall.

Kintyre-Ulster Cable?

The possibility of the North of Scotland Hydro-Electric Board exporting power was visualized by Mr. A. E. MacColl, deputy chairman, at the opening ceremony of the Board's touring exhibition in Campbeltown last week. It was within the bounds of engineering possibility, he said, that a submarine connection might be made with Northern Ireland whereby the output from a large thermal generating station in the Kintyre area might be exported to Northern Ireland. Campbeltown rested on a solid foundation of wealth, with a very extensive coalfield at Machrihanish, the only one in the Board's area.

The exhibition, which was the largest and most comprehensive mobile exhibition yet undertaken by the Board, ran for three days. Many of the appliances on view were being shown in the area for the first time. Considerable interest was aroused by the singing of the Campbeltown Gaelic Choir, winners of all the leading awards at last year's Highland Mod.

Eastern Board's First Year

In its first twelve months' working the Eastern Electricity Board completed mains extensions totalling 766 miles, of which 344 miles were h.v. and 422 miles l.v. The number of new substations put into service was 733 with a capacity of 128,512 kVA. Extensions to existing substations accounted for an increased capacity of 79,558 kVA, making an increase in total substation capacity of 208,070 kVA. Electricity purchased aggregated 3,735 million kWh, an increase of 12.2 per cent. New consumers numbered 52,075 and included 1,207 farms and 356 housing estates. The total number of consumers in the area at 31st March last was 1,233,086.

Hire Schemes

The Midlands Electricity Consultative Council last week passed resolutions in favour of the continuation of the hire of electrical apparatus, such as cookers, kettles, etc. A letter was received from Solihull U.D.C. saying that it had been informed that the Midlands Electricity Board intended to withdraw all such facilities. The Consultative Council, on the recommendation of its General Purposes Committee, approved a resolution expressing the view that the cessation of hiring would be detrimental to the smaller income class, and that the conditions which used to apply should continue. It was also thought that a uniform scheme for the hire of electrical apparatus throughout the country was desirable.

S.W. Board's Plans

The development plans of the South-Western Electricity Board for 1949-50 were outlined by Mr. S. F. Steward, chairman of the Board, at the second meeting of the Area Consultative Council (chairman, Alderman H. J. Perry), held at Exeter last Friday. It was reported that during 1948-49 there were 24,000 new consumers, and a further 28,000 would, it was estimated, be added during the next financial year. Mr. Steward said that over 55 per cent of the area was as yet incapable of development, and he referred to the scheme, already announced, for the extension of the 11 kV secondary network at a cost of £2,000,000.

Special attention was being given to the needs of the northern part of Bristol, where the Board was planning a new bulk supply point and, associated with it, a new distribution centre at Filton; £250,000 had been earmarked for this project during the present financial year. In Plymouth, heavy new demands had been created by the reconstruction of the city centre and the development of new housing estates such as that at Plympton. Also, additional supplies were required for East Cornwall and West Devon, where the existing system was

overloaded and the statutory voltage could not be maintained. The first stage of this project consisted of the construction of new h.v. lines from Prince Rock power station. In North Devon the 33 kV line to Ilfracombe was to be completed and an improved supply made available to Barnstaple and Bideford. To cater for the additional load in the Torquay area work would proceed on additional 33 kV lines from Newton Abbot.

It was stated that since the inaugural meeting of the Council on 24th January, the public had submitted 22 representations; five were still under discussion between the Board and the Council, 16 had been dealt with to the satisfaction of the consumer, and in only one instance had the consumer been dissatisfied.

Walsall Power Station

Horseley Bridge & Thomas Piggott, Ltd., who are the sole contractors, fabricators and erectors for the whole of the structural steelwork for the Walsall power station, inform us that they expect to complete their contract in the early summer. An article describing the main constructional features appeared in our issue of 21st January, 1949, and when the station is complete the *Electrical Review* will publish a second article dealing with the operational aspects.

Water for Brimsdown

The British Electricity Authority has applied to the Minister of Health for a licence to construct works and abstract underground water at the site of the Brimsdown generating station to a maximum quantity of 450,000 gallons per day. A copy of the application and map may be inspected at the Public Offices, Enfield. Any objections against the proposal must be notified to the Secretary, Ministry of Health, within 28 days from 22nd April.

Electricity Output

During the week ended 15th April 809.5 million kWh was sent out for public supply from solid-fuel fired stations, against 896.6 million in the preceding week and 791.4 million in the week ended 16th April, 1948.

Glasgow Charges

Members of Parliament for Glasgow on 22nd April held a meeting with the Corporation special sub-committee which recently protested unsuccessfully to the Minister of Fuel and Power against the increased electricity charges. After a lengthy discussion the meeting decided to urge that in view of the fact that domestic consumers within the city had been saddled with an unfair proportion of the increased expenditure falling on the electricity supply industry, an immediate review of the ordinary domestic tariff should be made, and that each consumer should be reimbursed after the summer for any loss sustained as a result of the winter surcharge. Later Lord Provost Sir Hector M'Neil submitted the resolution to the Consultative Council, together with a statement of the views of the M.P.s and the Corporation.

Reconstruction of Berlin Station

The reconstruction of the Berlin West power station, dismantled by the Russians in 1946, is being proceeded with. Reports from Berlin say that it will be necessary to convey by air something like 6,000 tons of plant. One correspondent states that it is proposed to carry in one lift a load of 15½ tons—presumably the rotor of the turbo-generator set which is to be erected in the station.

South Wales Questions

The South Wales Electricity Consultative Council, at its meeting last week, decided to ask the Area Board whether an interim scheme for supplying electricity to farms was planned. Mr. David Lewis said that less than 10 per cent of South Wales farms were electrified. Mr. Haydn Lewis complained that installation charges had risen almost 100 per cent since nationalization, asserting that a power point which before cost 30s now cost £2 11s. Mr. J. T. Evans, who referred to church organs at Cwmavon which, though adapted for electricity, could not be used because there was no supply, was told that the Board was preparing a report on the matter. Details of the progress of plant extensions in South Wales were given by Mr. H. V. Pugh, divisional controller.

Illuminations

Arrangements have been made at Southend-on-Sea for an illuminations scheme during the six weeks from 7th September, comprising coloured floodlighting of the cliffs, gardens and flow beds, and striplighting along the seafront from the Kursaal to Shorefields, Westcliff. In addition, the pier illuminations, which were inaugurated at Easter, will be on display throughout the summer and will be augmented for the autumn scheme. Illuminations have also been provided at the various entertainments along the front.

Wallasey Publicity and Entertainments Committee has approved an estimate of £2,155 submitted by the borough engineer for the overhaul and reinstatement of the New Brighton illuminations on a pre-war basis.

FINANCIAL SECTION

Reports and Dividends

The British Aluminium Co., Ltd.—In the course of his speech at the annual meeting held on 20th April, Mr. R. W. Cooper (chairman) said that a considerable programme of reconstruction was in hand at their alumina works at Burntisland and Newport with a view to effecting economies. Their production facilities were fully occupied and their export business constituted a considerably larger proportion of their total business in 1948 than it did in 1947. Referring to the subsidiaries, the chairman said that the Aluminium Wire & Cable Co., Ltd., continued operation on a small scale. It would be some considerable time before the main items of this plant would be delivered and it could operate on a fully commercial basis.

The Lancashire Dynamo & Crypto, Ltd., reports a consolidated trading profit for 1948 of £369,164, plus income from investments of £11,042, making £380,206. After providing for depreciation, profits tax, income tax, etc., there is a net profit of £138,106. It is proposed to pay a second interim ordinary dividend, including bonus, of 17½ per cent, making 22½ per cent for the year (unchanged). A sum of £10,076 (against £1,978) has been carried forward in subsidiaries and £230,784 (against £206,991) in the parent company.

In a circulated statement, Mr. H. W. Bosworth (chairman) says that during the next year or so there will be some expansion of the company's interests in South Africa, where with another electrical company they will be taking an interest in local manufacture. In this country during the present year there will be some further capital expenditure throughout the group. These commitments, together with the unavoidably large investment in stocks and work in progress, will fully employ the company's present capital and the whole question of finance is receiving the directors' consideration.

W. T. Henley's Telegraph Works Co., Ltd., reports that the net profits of the parent company (subject to audit) after tax and including income from profits on realization of investments and a special payment relating to earlier years of £67,326, amounted to £781,978 for 1948, as compared with £766,493 (including a special receipt of £97,245) for 1947. From this the following allocations have been made: Reserve for fluctuation in prices of materials, £150,000; reserve for replacement of plant, etc., £100,000; reserve account, £100,000; staff pensions, £150,000. The ordinary dividend for the past year is maintained at 20 per cent, less tax, with a final dividend of 10 per cent, and a bonus of 5 per cent. The balance carried forward is £708,644 (against £610,365 brought in from last year).

A. Reyrolle & Co., Ltd., report a profit for 1948 of £303,381, as compared with £129,922 for 1947, to which is added £128,109 brought in, less £1,500 voted at the last general meeting for distribution among local charitable and other funds, making £429,990. From this, £65,000 has been allocated to stores and work in progress reserve, £25,000 to general reserve, £50,000 to development expenditure account and £40,000 to renewals account. As already announced, the final ordinary dividend is 7½ per cent, again making 12½ per cent, less tax, for the year, and the balance carried forward is £158,480.

The Sturtevant Engineering Co., Ltd., reports profits for 1948 of £293,511, as compared with £100,899 for 1947, and a net profit of £135,600 (against £41,301), to which is added £18,941 brought in. Reserve receives £75,000, and it is proposed to pay a final dividend of 11 per cent, plus a bonus of 5½ per cent, both free of tax, making 22 per cent for the year (against 16½ per cent tax free).

Laurence, Scott & Electromotors, Ltd., report a profit on trading for 1948 of £257,616, after providing £38,000 profits tax, as compared with £193,516 for the preceding year. The dividend on the "A" and "B" ordinary for the year is maintained at 12½ per cent, less tax.

The West London & Provincial Electric & General Trust, Ltd., reports a net profit for the year ended 31st March last of £30,431, as compared with £29,788 for the previous year. General reserve receives £3,000, and the final ordinary dividend is 5 per cent (against 4 per cent and a bonus of 1 per cent), again making 7 per cent for the year. The balance carried forward is £6,496 (against £5,778 brought in).

W. Canning & Co., Ltd., report a trading profit for the year ended 31st December last of £526,354, as compared with £539,959 for the preceding year, plus interest of £697. After providing £36,782 for depreciation, £15,000 for staff pensions, £5,000 provision for repairs, £53,245 directors' remuneration and £1,500 auditors' fees and expenses, there is a net profit, before taxation, of £415,524. Taxation absorbs £228,834, leaving a net balance of

£186,690 (against £181,442), to which is added tax reserve surplus of £2,865. General reserve receives £125,000, and it is proposed to pay a final ordinary dividend of 3d per unit, less tax, and a bonus of 10½d per unit, maintaining the distribution for the year at 1s 4½d per unit. The balance carried forward is £100,720 (against £89,790 brought in).

The Telegraph Construction & Maintenance Co., Ltd., reports a consolidated trading balance for 1948, including sundry revenue and after deducting subsidiary losses of £856 attributable to shares held outside the group, of £346,130, as compared with £225,711 for 1947. After providing for depreciation, tax, etc., the net profit of the group is £151,820 (against £60,042), to which is added £63,170 brought in, making £214,990 available. General reserve receives £35,000, replacement of assets reserve £40,000 and research and development £25,000. As already announced, the final ordinary dividend of the parent company is 5 per cent, again making 10 per cent for the year. The balance carried forward is £71,769.

The Rangoon Electric Tramway & Supply Co., Ltd., reports a profit for the year ended 31st December, 1947, of £8,101, as compared with £6,391 for the preceding year. The preference dividend for the half-year to 31st December, 1942, is paid and £25,342 is carried forward (against £24,741 brought in).

The National Gas & Oil Engine Co., Ltd., reports a trading profit of £231,455 for 1948, as compared with £115,444 for 1947, and a net profit of £166,365 (against £65,367), plus taxation reserves not required of £16,367. The ordinary dividend is maintained at 5 per cent, reserve for future taxation receives £75,000, and general reserve £50,000. The balance carried forward is £55,416 (against £43,462 brought in).

New Companies

Rotor Power Units, Ltd.—Registered 8th April. Capital £20,000. To acquire certain patents when granted to Andrew Fry and Frederick A. Fry; to acquire patents relating to the manufacture of machinery, electrical apparatus and apparatus connected with the transmission of signals by sound, light or any other method, etc. Directors: A. Fry, F. A. Fry, H. S. Jones, R. J. Dobell and H. S. Fox. Regd. office: 26K, Exchange Buildings, Liverpool, 2.

Derwent Exports (London), Ltd.—Registered 14th April. Capital £500. Agents, factors, merchants and manufacturers of electrical fittings and appliances, radio receivers and parts therefor, import and export agents, etc. E. Rich, 48, Corringway, Ealing, W.5, is permanent director. Regd. office: Dacre House, Dacre Street, London, S.W.1.

Belectromec, Ltd. — Registered 13th April. Capital £1,000. Electrical and mechanical engineers, manufacturers of and dealers in refrigerators, deep-freezers, refrigerating machinery, soda fountains, wireless sets, etc. Directors: J. A. Addison, C. C. Featherstone and W. F. C. Clifford. Regd. office: 4-8, Smith Street, Warrington.

Radio Sales and Services (Holborn), Ltd.—Registered 11th April. Capital £5,000. To acquire the business of radio and electrical and television dealers and retailers carried on by Helen Weinbaum, of 14, West Heath Court, West Heath Drive, Golders Green. Helen Weinbaum is first director. Regd. office: 29/31, Southampton Row, Holborn, W.C.1.

W. F. Graham & Co., Ltd.—Registered in Belfast, 31st March. Capital £10,000. Electrical engineers, electricians, etc. Subscribers: Ethel Setton and Margery W. Stevenson, 13, Dougall Place, Belfast.

Plessey International Ireland, Ltd.—Registered in Dublin 26th March. Capital £30,000. Electricians, electrical engineers and manufacturers of all kinds of electrical machinery, etc. Subscribers: A. G. Clarke, 17, Ennismore Gardens, London, S.W.7; R. Green, 11, Wellington Quay, Dublin; and D. Green, 11, Wellington Quay, Dublin.

Brinkman & McIntyre, Ltd.—Registered 14th April. Capital £100. Manufacturers of and dealers in electrical equipment and accessories, etc. Directors: J. M. I. A. McIntyre and C. Brinkman. Regd. office: Oxford Road, Benson, Oxon.

Liquidation

Kee Radio & Electrical Equipment Co., Ltd.—Particulars of claims by 6th May to the liquidator, Mr. P. E. Barber, 79, Easton Street, High Wycombe.

Bankruptcies

C. S. Lewis, 347, Eastern Avenue, Ilford, Essex, electrical contractor and retailer.—First meeting 3rd May at 20, Eaton Place, London, S.W.1. Public examination 27th May at the Shire Hall, Chelmsford.

I. F. Moore, 3, Club Street, Kettering, Northants, electrical contractor.—Receiving order made 12th April, 1949, on debtor's own petition. First meeting 27th April at the Official Receiver's office, 6, The Parade, Northampton. Public examination 9th May at the County Hall, Northampton.

STOCKS and SHARES

NEXT week, dealings will start in the Stock Exchange in the new Gas Stock. Some people have been selling their existing gas stocks, using the money in the purchase of industrial ordinary and preference shares, in order to obtain a better yield than they would get from the new issue.

In consequence of this movement, the ordinary shares of industrial undertakings, particularly those of the better class order, show rises on the week, and, with the demand still unsatisfied, the market can be described as firm. Absorption of such shares has included those in the electrical equipment and manufacturing group, besides the gilt-edged British Transport and British Electricity issues have improved to 102$\frac{5}{16}$ and 103 respectively.

Week's Price Changes

Amongst the shares for which there is a steady inquiry may be mentioned Aron 43s 9d, Associated Electrical 76s 3d, Crompton Parkinson 26s, Johnson & Phillips 72s 6d, General Electric 86s 6d, Murex 92s 6d, Walsall Conduits 60s, and Chloride Electrical 96s 3d, all of which are better to the extent of 1s to 2s. Globe Telegraphs hardened to 45s and Oriental Telephones to 51s 3d. Vactric at 18s 9d are $\frac{1}{16}$ better; De La Rue, after being 38s 3d, eased off to 37s. The falls are few and insignificant. Telephone Properties at 13s 9d are $\frac{1}{16}$ down; Decca gave way to 17s and E.M.I. to 17s 6d; Greenwood & Batley, 52s 6d, are 9d lower. Cable & Wireless ordinary, 229½, is practically unchanged on the week; the preference at 118¼ is a point to the good.

Electrical Equipment Shares

Fortified by such impressive results as those produced by Telegraph Construction, and Reyrolles, electrical manufacturing shares reflect the recovery of industrial markets from the post-Budget malaise. They are ranked still among the best in the field of capital equipment. At their offered prices, B.I.C. shares, at 35s, A.E.I., at 76s 6d, and Automatic Telephones at 63s have again crossed below the 4 per cent yield mark. G.E.C. and Henleys return only a little above 4 per cent.

Company News

Laurence, Scott & Electromotors' preliminary profits statement shows that the big improvement in last year's results maintained momentum during 1948. Earnings at £258,000 are another £64,000 higher. Although still below the pre-war rate, the dividend is kept at 12½ per cent, which affords a return of 4¾ per cent on the 5s shares at 13s 3d cum dividend. Lancashire Dynamo's full accounts show group earnings of over 50 per cent available for the 22½ per cent dividend. Reference is made in the report to financial questions arising from projected capital expenditure and from the unavoidably large investments in stocks and work in progress, which account for over £1½ million in the balance sheet. At 5½, the shares give £4 8s per cent on the money.

Telegraph Construction Profits

The £1 shares of Telegraph Construction and Maintenance, which were down to 45s earlier this month, have advanced to 47s 6d ex dividend since the issue of the accounts. These disclosed a noteworthy expansion of net profits, from £60,000 to £152,000. All the company's capital of £782,000 is in ordinary shares, so that earnings appear to cover about three-and-a-half times the net cost of the dividend, which is maintained at 10 per cent for the twelfth time in succession. Telegraph Constructions yield 4½ per cent.

E.M.I. New Preference

Holders of Electric & Musical Industries 6 per cent preference stock have until 2nd May to decide on the offer to convert into the new 4½ per cent preference shares. These are offered on the basis of one new share at 21s 6d for each £1 of the old stock. Those converting will receive, for every £100 stock now held, 100 new shares, plus a cash payment of £6 5s 11d. Dividends on the latter will accrue from 5th May, so that the first dividend next December will amount to nearly £3 per cent gross. At 21s 6d, the new shares are on a yield basis of £4 3s 9d. per cent; they are redeemable at 22s 6d., in or after 1959. The present holder's alternative is to accept repayment at 22s 6d per £1 stock on 15th July next.

Preference Shares

Between the industrial risk in ordinary shares, and the meagre income from the gilt-edged market, sound preference shares continue to stand in high popular favour. Yields now range upwards from the 3¾ per cents at par, G.E.C. 4½ per cents at 22s 7½d, B.I.C. 5½ per cents at 29s 6d. The return is about half-a-crown per cent higher on London Electric Wire 7½ per cent and Laurence, Scott 4½ per cent shares at 38s 9d and 22s respectively. Four per cent is offered on Ferranti sevens at 35s. On the 5½ per cent issues of E. K. Cole, at 23s, B.V.C., at 22s, and Brush, at 18s 9d. the respective yields are 4¾, 5 and 5⅞ per cent.

Institute of Welding

A SPRING meeting is being held by the Institute of Welding this week at Southsea. The first day was occupied with a conference of branch officers and a civic reception in the evening was followed by a novel form of discussion on five aspects of welding. On the second day members travelled by road to Southampton where a paper was read at the Civic Centre by Mr. F. Hargreaves on "Welding in Locomotive Construction and Repair." After luncheon, at which the Mayor and Deputy Mayor were to be present, the liner *Queen Mary* was visited in the main dock.

On the third day papers were presented by Mr. G. B. Evans on "The Welding of Aircraft" and by Mr. R. Anscomb on "Welding Developments in the Royal Dockyards and Private Shipyards since 1939." There were alternative afternoon visits to the Royal Naval Dockyard at Portsmouth, the works of Airspeed, Ltd., and an expedition to Winchester for the ladies, all returning to Southsea for the conference dinner. On the last day there were alternative visits to the Eastleigh locomotive works, the Woolston shipyard of John I. Thornycroft & Co., Ltd., the Cowes shipyard of J. Samuel White & Co., Ltd., including an all-welded destroyer on the slips, or a coach tour of the Isle of Wight.

Turbo-Electric Ships

DESTINED for daily service between Vancouver Island and the mainland of Canada, including calls at Vancouver and Seattle, the 6,000-ton turbo-electric passenger ship *Princess Marguerite* has completed her trials and was handed over to the owners, the Canadian Pacific Railway Company, by the shipbuilders, Fairfield Shipbuilding & Engineering Co., Ltd., on 5th March. Her sister ship has just undergone basin trials and is shortly due for acceptance trials. Both vessels are designed for 2,000 day passengers, with sleeping accommodation for 98, and capacity for 60 cars.

The propulsion machinery, manufactured by the British Thomson-Houston Co., Ltd., includes two 6,000 kW, 3,150 r.p.m., 3,200 V, three-phase, 52.5 c/s turbo-alternator sets feeding two 7,750 s.h.p., 28-pole, 225 r.p.m., enclosed fan-cooled synchronous propeller motors which are excited direct from the 220 V d.c. auxiliary bus-bars. The flexibility of the drive is such that either or both of the motors can be fed by either turbo-alternator set with the other set and its attendant auxiliaries shut down.

As a higher than normal torque may be called for during starting or reversing, the alternator excitation is controllable and is derived from two separately excited 50 kW, 1,000 r.p.m. machines tandem driven with the ship's two 350 kW auxiliary turbo-generators. While each exciter normally supplies one alternator field, each is capable in an emergency of supplying both fields. Further, two hand-operated, spring-loaded switches are fitted adjacent to the lever gear and each is connected in one of the exciter field circuits so that it can be boosted to double the alternator field should a particularly rapid reversal be required.

Some details of the trials of the *Princess Marguerite* are of particular interest: with speed trials completed and the 23 knots specified at 15,500 s.h.p. slightly exceeded, attention concentrated on the turning trials, first with rudder hard-a-starboard and then later hard-a-port. It was found that, even at full speed with helm hard over, the two screws, although taking different loads, were both still turning at a steady 225 r.p.m. The advantage of being able to use full power astern as well as ahead was demonstrated when both propellers were stopped in about 22 seconds, and the ship brought to a standstill in a little over 1.5 minutes.

E.R.A. Reports

RECENTLY issued advance summaries of E.R.A. technical reports include J/T.146 (price 6s) which gives some particulars of the 9,450 kW Brown-Boveri gas turbine that was installed at the Hermann Goering steel works at Watenstedt. It was brought from Germany to England by the Ministry of Supply and dismantled by C. A. Parsons and Co., Ltd., for inspection by interested firms.

Report K/T.127 (price 6s) deals with an investigation by Mr. P. Schiller of sample domestic two-part tariff consumers selected from in and around London. It links up with the comprehensive returns in report K/T.125 and a graph of the distribution of annual maximum demand amplifies information given in report K/T.122.

In report L/T.194 (price 6s) Messrs. D. W. Bird and H. Pelzer give more information about the crystallite size and intrinsic electric strength of polythene described in L/T.160.

In report Z/T.77 (price 18s) Dr. F. Busemann summarizes comparative economic considerations regarding d.c. and a.c. transmission of power, which subject has been treated of in more detail in Z/T.67-71 and other Committee papers.

Copies of these reports are obtainable from the Electrical Research Association, Thorncroft Manor, Dorking Road, Leatherhead, Surrey.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1942

1876. France, H. de.—Synchronizing arrangements for television systems. 12th March, 1941. (621484.)

1944

20268. British Thomson-Houston Co., Ltd.—Vitreous tubular envelopes. 21st October, 1943. (621465.)

21366. British Thomson-Houston Co., Ltd.—Electric timing circuits, particularly for resistance welding. 1st November, 1943. (621466.)

23438. British Thomson-Houston Co., Ltd.—Automatic reclosing circuit-breaker systems. 24th November, 1943. (621197.)

1945

1604. British Thomson-Houston Co., Ltd. (General Electric Co.).—Phase convertors. 19th January, 1945. (621375.)

2962. British Thomson-Houston Co., Ltd.—Control circuits for single phase capacitor motors. 8th February, 1944. (621470.)

3670. British Thomson-Houston Co., Ltd. (General Electric Co.).—Electrical contact elements. 14th February, 1945. (621471.)

12034. Soc. Le Carbone-Lorraine.—Sliding contacts for electric machines. 3rd June, 1942. (621108.)

14637. Stevens, A. H. (Submarine Signal Co.).—Submarine signalling apparatus. 8th June, 1945. (Convention date not granted.) 621114.)

14902. Aktiebolaget Elektrolux.—Protection of electrically driven machines against overloading. 3rd August, 1944. (621115.)

15334. Smith & Sons (England), Ltd., S., and Meredith, F. W.—Automatic control systems. 15th June, 1945. (Cognate application 17663/46.) (621473.)

18237. Pye, Ltd., and Lord, A. V.—Generator of time modulated pulses. 17th July, 1945. (621474.)

25891. Marconi's Wireless Telegraph Co., Ltd., and Lay, A. W.—Stabilized spark gap system suitable for high-frequency current generators. 4th October, 1945. (621476.)

26789. Pye, Ltd., Lawson, D. I., and Lord, A. V.—Television systems. 12th October, 1945. (621479.)

27036. Ducruet, A. J.—Magneto machine for calling on a telephonic apparatus. 13th October, 1943. (621202.)

27722. Harmer, H. M.—Electrical regulating arrangements. 22nd December, 1945. (621203.)

33203. Soc. Anon pour les Applications de l'Electricité et des Gaz Rares-Etablissements Claude-Paz et Silva.—Apparatus for studying the rapid variations of the intensity of a source of light. 21st March, 1945. (621482.)

35156. Marconi's Wireless Telegraph Co., Ltd.—Electrical oscillators. 29th December, 1944. (621206.)

35272.—Sperry Gyroscope Co., Inc.—Object detecting systems utilizing electro-magnetic energy. 30th April, 1942. (Divided out of 621485.) (621483.)

35275. Sperry Gyroscope Co., Inc.—Automatic radio tracking system. 30th April, 1942. (Divided out of 621485.) (621493.)

1946

672. Pye, Ltd., Lawson, D. I., and Lord, A. V.—Television receivers. 8th January, 1946. (Cognate application 12752/46.) (621494.)

3616. Standard Telephones & Cables, Ltd., McWhirter, E. M. S., Dunn, R. H., and Lennox, P. W.—Electric signalling systems. 5th February, 1946. (621384.)

5779. Stevens, A. H. (Submarine Signal Co.).—Compressional wave transmitting and receiving apparatus. 25th February, 1946. (Convention date not granted.) (621125.)

6029. Marconi's Wireless Telegraph Co., Ltd.—Frequency modulation systems. 26th February, 1945. (621385.)

6030. Marconi's Wireless Telegraph Co., Ltd.—Signal generating systems. (26th February, 1945. (621386.)

10993. Standard Telephones & Cables, Ltd., and Roberton, J. S. P.—Spools and coils for electrical devices. 10th April, 1946. (621210.)

11293. Electrofio Meters Co., Ltd., and Tabor, H.—Electrical measuring, indicating, recording, controlling or like apparatus. 12th April. 1946. (621388.)

15718. Ninni, I., and Roluti, G.—Automatic electromechanical device for cutting gramophone records. 30th December, 1944. (621214.)

19738. Standard Telephones & Cables, Ltd., Hellier, W. H. M., McWhirter, E. M. S., and Ward, H. J.—Electrical apparatus supports. 2nd July, 1946. (621138.)

19739. Standard Telephones & Cables, Ltd., Hellier, W. H. M., McWhirter, E. M. S., and Ward, H. J.—Electrical apparatus supports. 2nd July, 1946. (621139.)

21642. Gallop, J. W.—Magnetic circuits. 19th July, 1946. (621220.)

24713. Marconi's Wireless Telegraph Co., Ltd.—Ultra-short wave receivers. 20th August, 1945. (621223.)

25391. British Thomson-Houston Co., Ltd., and Moir, J.—Two-conductor signal transmission circuits. 26th August, 1946. (621511.)

25721. De Montigny, M. V. G. B. De M.—Magnetic cores used as coil-holders in oscillating circuits. 15th December, 1943. (621150.)

28034. Metropolitan-Vickers Electrical Co., Ltd., Miller, C. W., and Saxon, G.—Electromagnetic wave guides. 18th September, 1946. (621513.)

28039. British Insulated Callender's Cables, Ltd., and Jones, P.—Bags for bag moulding. 18th September, 1946. (621514.)

28739. Metcalfe, C., Divall, R. W., and Marrs, T. J. D.—Electrical toasting appliances. 26th September, 1946. (621155.)

29552. Radio Corporation of America.—Oscillation generator. 3rd October, 1945. (621402.)

31207. Marshall, J. N.—Electric wave coupling devices. 24th October, 1945. (621167.)

34711. British Thomson-Houston Co., Ltd., and Jefferson, H. F.—Means for controlling the speed of rotating devices or machines. 22nd November, 1946. (621177.)

35504. Metropolitan-Vickers Electrical Co., Ltd., and Mandl, A.—Electric heating systems for vehicles. 29th November, 1946. (621525.)

1947

129. Standard Telephones & Cables, Ltd., Starr, A. T., and Grayson, H.—Electric broadband carrier communication system. 2nd January, 1947. (621527.

291. Mordell, D. L.—Gas turbine power plants. 3rd January, 1947. (621407.)

995. Armstrong, E. H.—Frequency modulation systems. 12th January, 1940. (621228.)

996. Armstrong, E. H.—Radio rebroadcasting system. 12th January, 1940. (621229.)

1245. Steen, C. A.—Electric steam heating devices. 14th January, 1947. (621532.)

2018. Philips Lamps, Ltd.—Apparatus comprising a wall consisting of moulded or cast material in which a bearing for a shaft is formed. 19th January, 1944. (621534.)

2269. Philips Lamps, Ltd.—Electron-beam tubes. 31st December, 1943. (621536.)

3018. Philips Lamps, Ltd.—Insulating supports for use in electric circuits. 21st February, 1944. (621411.)

3626. Jessop & Sons, Ltd., W., and Oliver, D. A.—Methods of manufacturing permanent magnets. 7th February, 1947. (621413.)

3632. Tinnerman Products, Inc.—Fastening devices, more particularly for securing lamp sockets. 8th April, 1946. (621414.)

3740. Metropolitan-Vickers Electrical Co., Ltd., and Ludlow, J. H.—Annealing treatment of metal strip and wire. 7th February, 1947. (621233.)

3753. Parsons, Ltd., C. H., and Handley, G. B.—Electrical plug-and-socket connectors. 7th February, 1947. (621234.)

3814. Chloride Electrical Storage Co., Ltd., and Gray, R.—Electric accumulators. 10th February, 1947. (621239.)

3881. First Industrial Corporation.—Electrical switch contacts. 11th February, 1946. (621247.)

3902. Bendix Aviation Corporation.—Electrical plug-and-socket connectors. 20th September, 1945. (621250.)

3952. Telegraph Condenser Co., Ltd., and Sporing, P. A.—Electric terminals and bushes. 11th February, 1947. (621252.)

3968. General Electric Co., Ltd., and Fitzpatrick, J. A.—Electrical protective arrangements. 11th February, 1947. (621253.)

3970. Aktieselskabet Fisker & Nielsen.—Pipe joints, particularly for vacuum cleaning apparatus. 4th March, 1946. (621254.)

4009. Metropolitan-Vickers Electrical Co., Ltd., Smith, D. M., and Shannon, J. F.—Multi-stage axial-flow compressors or turbines. 11th February, 1947. (621256.)

4029. Walsall Conduits, Ltd., and Gough, E.—Electric tumbler switches. 12th February, 1947. (621416.)

4139. British Insulated Callender's Cables, Ltd., and Kretschmer, J. M. (Legal representative of Kretschmer, H. E., deceased).—Application of coatings of enamel and other material to rectangular wire. 13th February, 1947. (Cognate application 8062/47.) (621265.)

4173. Philips Lamps, Ltd.—Wireless receivers with bandspreading. 11th March, 1944. (621267.)

4207. Westinghouse Brake & Signal Co., Ltd., and Walker, A. H. B.—Rectifier circuits. 13th February, 1947. (621290.)

4268. Westinghouse Electric International Co.—Dynamo-electric machines. 19th November, 1945. (621275.)

4324. Burndept, Ltd., and Lewis, R. W.—Electric dry batteries. 14th February, 1947. (621280.)

4364. British Thomson-Houston Co., Ltd.—Ironing machines. 21st February, 1946. (621297.)

4378. First Industrial Corporation.—Rotary-operated snap-acting devices. 18th February, 1946. (621299.)

4442. Linde Air Products Co.—Gas-blanketed arc welding torch. 8th March, 1946. (621303.)

4452. Dunn, W. E.—Electric couplings of the plug-and-socket type. 15th February, 1947. (621307.)

4510. Martin, J. M., and England, R. K.—Electric motors. 17th February, 1947. (621309.)

4531. Philips Lamps, Ltd.—Insulated lead-through devices. 14th March, 1944. (621310.)

4532. Philips Lamps, Ltd.—Circuits for limiting the amplitude of electrical oscillations. 11th March, 1944. (621311.)

4599. Aktiebolaget Hakanssons Industrier.—Electrolytic interrupters. 30th March, 1946. (621546.)

4609. Sanders & Co., (Wednesbury), Ltd., W., Bayliss, G. H., and Manoin, E. B.—Electrical fuses. 18th February, 1947. (621316.)

4632. T. I. (Group Services), Ltd., and Reed, J. P.—Methods of electrical cooking. 18th February, 1947. (621320.)

4658. Etablissements Merlin & Gerin.—Electric circuit-breakers having arcing-contacts. 4th August, 1944. (621323.)

4677. Greenwood's & Airvac Ventilating Co., Ltd., and Hughes, B. D.—Rotors for electric fans. 18th February, 1947. (621326.)

4695. Imperial Chemical Industries, Ltd.—Electrolytic cells. 18th February, 1946. (621550.)

4717 First Industrial Corporation.—Fixing of component parts in electric switches. 26th April, 1946. (621328.)

4886. British Driver-Harris Co., Ltd. (Driver-Harris Co.).—Electrical resistance elements and alloys for use therein. 19th February, 1947. (621343.)

4952. Lowe & Co., Ltd., R. H., and Stott C.—Work-tables for supporting apparatus adapted to be driven by an electric motor. 20th February, 1947. (621347.)

5035. Garrett Corporation. — Gas-turbine-driven auxiliary power and air conditioning system. 19th August, 1946. (621351.)

5058. Lombard, A. A., Vincent, K. I. C., and Morley, F. W. W.—Multi-stage axial compressors and turbines. 20th February, 1947. (621418.)

5167. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Flash-light lamps. 25th February, 1946. (621359.)

5177. British Thomson-Houston Co., Ltd. (General Electric Co.).—High temperature alloys. 21st February. 1947. (621361.)

5281. Munday, E. J., and Horne, W. A. J.—Permutation switch for the ignition system of a motor vehicle and/or a magnetic lock. 24th February, 1947. (621372.)

5479. General Electric Co., Ltd., and Friedlander, E. S.—A.c. electric load controlling devices and a.c. electric supply systems. 25th February, 1947. (621436.)

5486. Scophony, Ltd., and Clarke, H. F.—Squirrel-cage rotors. 25th February, 1947. (621437.)

5588. Plessey Co., Ltd.—Slide wire permeability tuning unit. 26th February, 1946. (621447.)

5657. Westinghouse Electric International Co.—Electric gas-blast circuit interrupters. 24th October, 1945. (621452.)

5785. Pye, Ltd., and Butler, T. A.—Electric plug-and socket couplings. 28th February, 1947. (621459.)

6816. Bill, J. H., and Morley, F. W. W.—Axial-flow compressors and turbines. 11th March, 1947. (621551.)

1948

6827.—Wild-Barfield Electric Furnaces, Ltd., Haywood, F. W., and Laidler, D. S.—Case hardening ferrous articles. 26th March, 1947. (Divided out of 610356.) (621553.)

21703. Aktieselskabet Moss Glasverk.—Electrodes for glass smelting furnaces. 28th January, 1941. (Divided out of 620760.) (621282.)

Amended Specifications

522749. Rawlings, G. W.—Manufacture of imbricated electro-magnetic elements.

585357. Sperry Gyroscope Co., Inc.—Method of and apparatus for surveying objects with electromagnetic energy.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 20th April:—

RHODOPAS. No. 665,202. Class 9. Electrical apparatus and instruments included in Class 9; scientific, optical, cinematographic and sound-reproducing instruments and apparatus, etc.—Société des Usines Chimiques Rhone-Poulenc, Paris. Address for service, c/o W. Symmons & Co., 329, High Holborn, London, W.C.1.

HYDISS. No. 670,192. Class 9. Electrical resistances.—British Electric Resistance Co., Ltd., Queensway, Ponders End, Middx.

ELETTRA. No. 670,527. Class 9. Electrical apparatus and parts, all included in Class 9.—Marconi's Wireless Telegraph Co., Ltd., Electra House, Victoria Embankment, London, W.C.2.

STERO. No. 671,549. Class 9. Electrical apparatus, instruments and parts, all included in Class 9.—R. A. Willams (Birmingham), Ltd., Wilton Corner, 447, Stratford Road, Sparkhill, Birmingham, 11.

DYNAFLOW. No. B670,123. Class 11. Electric fans, air heaters, coolers, filters (not being parts of engines), and air purifying, humidifying and drying apparatus.—Andrew Machine Construction Co., Ltd., Woodbank Works, Turncroft Lane, Stockport, Ches.

SILENTIME (design). No. B665,002. Class 14. Electric clocks.—British Electric Meters, Ltd., 51, King Street, Manchester, 2.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Coventry.—16th May. Housing Committee. Electrical installations on various housing estates. (22nd April.)

Lincolnshire.—21st May. County Council. Electrical work at proposed new workshop block, Grantham Technical College. (22nd April.)

22nd May. Re-wiring and supplementation of the fire alarm system at the residential establishment, St. George's, Stamford. (See this issue.)

Southend-on-Sea.—9th May. Borough Council. Supply and installation of an electrically driven submersible pump and motor, complete with 440 ft of cable, etc. Borough engineer.

Sutton Coldfield.—7th May. Corporation. Sound reinforcement system at Town Hall and Council House. (See this issue.)

Orders Placed

London.—L.C.C. Electrical installation at Stanhope Street Women's Institute, St. Pancras. —Buchanan & Curwen. Electrical installation at Kingsway Day Continuation School, Holborn. —Edgar C. Porter, Ltd.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Chemical and physical laboratory, Stevenson Street Works; Howard & Bullough, Ltd., Globe Works.

Ashton-under-Lyne.—Houses (106), Crowhill; A. T. Kemp, borough engineer, Municipal Offices.

Axminster.—Houses (30), Boxfield Road, for U.D.C.; Powell & Powell, architects, 3, Lower Terrace, Torquay.

Birkenhead.—Houses (256), Woodchurch estate (sections 2-4); H. J. Rowse, architect, Martins Bank Building, Water Street, Liverpool.

Blackwell.—Houses and bungalows (48), Tibshelf, for R.D.C.; architect and housing superintendent, 100, Chesterfield Road South, Mansfield.

Brandon.—Houses (24) with community hall and library for old people at Esh Winning and 56 houses at Sawmill Lane; U.D.C. surveyor.

Bristol.—Infants' school (£67,800); Benson Bros., Ltd., builders, 117, Ashley Down Road, Bristol, 7.

Bury St. Edmunds.—Clothing factory, Fayden Road; J. Harvey, Ltd., St. John Street.

Cardiff.—Exhibition hall proposed in Wood Street area; H. Budgen & Co., architects, 97, St. Mary Street, Cardiff.

Houses (100) North Crystals site; city engineer.

Cardiganshire.—First instalment of extensions to secondary school, Tregaron (£50,000); Rhys Jones, county architect, County Hall, Aberayron.

Caterham. — Rebuilding Congregational Church, Harestone Valley Road; R. M. Pigott, architect, 3, Cromwell Place, S.W.7.

Chatham.—Conversion of 55/59, Brook Street for use as industrial premises; A. G. Gray, Ltd., Albion Works, Dalston Lane, E.8.

Cheltenham.—Flats (64), Priors Road, Lynworth Farm estate, and houses (24); borough surveyor.

Chester.—Sewage pumping station, Great Saughall; T. Pritchard, engineer, R.D.C. Offices, 16, White Friars, Chester.

Chryston.—Ice cream factory; Gillespie, Kidd & Coia, architects, 19, Waterloo Street, Glasgow.

Clacton.—Adaptations to buildings for women's training college; H. Conolly, Essex county architect, Chelmsford.

Coventry.—Health centre (£175,000), Stoney Stanton Road and Broad Street; D. E. E. Gibson, city architect, 1a, Warwick Row.

Cromer.—Pumping station, etc., for waterworks extensions, for U.D.C.; J. C. Melliss & Co., consulting engineers, 110, Horseferry Road, London, S.W.1.

Crook.—Houses (86), Howden-le-Wear, for the U.D.C.; Page, Son and Hill, architects, 75, King Street, South Shields.

Dagenham.—Permanent buildings to house boiler plant for district heating scheme at Heath Park estate; Norman & Dawbarn, architects, 5, Gower Street, W.C.1.

Derbyshire.—County college, Belper, for Derbyshire Education Committee; F. Hamer Crossley, county architect, Derby.

Dover.—Flats (67), Buckland Valley estate; borough engineer.

Droitwich.—Factory, Hampton Road; P. A. McGuffie, 6, Stalls Farm Road.

Aluminium die casting factory, Hampson Road; Bromsgrove Casting Co., Ltd.

Dudley.—Dwellings (338), Old Park Farm estate; Bridgwater & Shepherd, architects, 42, Bruton Place, London, W.1.

Ealing.—Cold storage, offices, workshops etc., South Ealing Road; London Co-operative Society, Ltd., Maryland Street, E.15.

Gateshead.—Cubicle block at the Sheriff Hill Infectious Diseases Hospital (£13,000); Tate & Holmes, Ltd., builders, Benwell, Newcastle-on-Tyne.

Preliminary training school at Windy Nook Hospital for the Newcastle Hospital Board; Spence and Price, architects, St. Mary's Place, Newcastle-on-Tyne.

Hereford.—Technical college, Newtown Road; W. Usher, architect, Bath Street.

Hexham.—Extensions, Barrasford Sanatorium; Cackett, Burns, Dick & McKellar, 21, Ellison Place, Newcastle-on-Tyne.

Hull.—Three-storey flats, Southcoates Lane; city architect.

Industrial development, Wharfside; Regent Oil Co., Ltd., 117, Park Street, London, W.1.

Huntingdon.—Staff quarters (£40,000), Brampton Park R.A.F. Station; Air Ministry, Kingsway, London, W.C.2.

Lanchester.—Temporary outpatients' dept. at Lee Hill Hospital; Fennell & Co., architects, Bridge End Chambers, Chester-le-Street.

Leicester.—New buildings for University College; Thomas Worthington & Sons, architects, 178, Oxford Road, Manchester.

Leith.—Additions and alterations, Couper Street and East Cromwell Street (£20,000); Melroses, Ltd., tea and coffee merchants.

Manchester.—Swimming baths, Wythenshawe and completion of Old Hall Drive Secondary School (£94,275); city architect.

Newcastle (Staffs.).—Sixteen flats, Brampton Road, for Bramfield Estates Co.; Holins, Jones & Oldacre, architects, Lloyds Bank Chambers.

Pottery works, Chesterton to Knutton Road; F. Hessan & Co., Ltd., Newcastle Street, Burslem.

Norwich.—Rebuilding shops and flats, Magdalen Street; Loynes & Sons, 38, St. Benedicts Street.

Houses (158), South Park Avenue estate; city engineer.

Peterborough.—Technical college (£155,858); E. H. Burgess, Ltd., builders, London.

Reading.—Showrooms, offices and workshops, Great Knollys Street; S. & C. Skinner, Ltd., Cattle Market.

Junior school, school meals centre and additional assembly hall; borough architect, Town Hall.

Rotherham.—Public swimming baths, Herringthorpe Valley Road, and central bus station, Frederick Street; E. J. Manson, borough engineer, Municipal Building.

Sheffield.—Flats (69), Edward Street; city architect.

South Shields.—Houses (36), Centenary Avenue; borough engineer.

Stockport.—Public wash houses; W. F. Gardner, borough surveyor.

Rebuilding and extending foundry, Romiley Street, Portwood; J. Needham & Sons, Millgate Foundry.

Stockton-on-Tees.—Houses (104) near Darlington Lane and Durham Road; A. G. Sinclair, borough architect, 28, The Square, Thistle Green.

Stretford.—Block of flats, Kings Road and Edge Lane; R. R. & J. Willan, builders, Daisy Estate, Worthington Road, Sale, Ches.

Tottenham.—Flats (76) and aged persons' dwellings (24), Devon Road for T.C.; Gorham Contractors, Ltd., builders, 4, The Crescent, Goring Road, Goring-by-Sea.

Walsall.—Two blocks of flats, Forest Housing site, for T.C.; Sanders & Proffitt, architects, 145, Lichfield Street.

Factory and offices, Bescot Crescent; H. J. Roberts (Confectionery), Ltd., 1, Walsall Road, West Bromwich.

Warwick.—Houses (52), for R.D.C.; Harry W. Weedon & Partners, 129, Lordswood Road, Birmingham, 17.

West Bromwich.—Completion of Kenrick Technical College; A. J. P. Pashler, 50, Newhall Street, Birmingham, 3, consulting engineer for heating and lighting installations.

Whyteleafe.—Factory; North Downs Engineering Co., Ltd., Godstone Road.

Worthing.—Flats, Canterbury Road and Princess Avenue; Frank Sandell & Son (Worthing), Ltd., builders, Chatsworth Chambers, Chatsworth Road.

Next Week's Events

Monday 2nd May, to Friday, 13th May

LONDON AND BIRMINGHAM.—Olympia and Earls Court, London, and Castle Bromwich, Birmingham. British Industries Fair.

Monday, 2nd May

BIRMINGHAM.—James Watt Memorial Institute, 6 p.m. I.E.E. South Midland Centre. The Fortieth Kelvin Lecture on "Semi-Conductors and Rectifiers," by Prof. N. F. Mott.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "A Method of Carrier Frequency Synchronization for Broadcasting Transmitters," D. J. Whythe, and "An Application of Wave Analysis to Routine Frequency Response Measurements," by I. J. Shelby.

Tuesday, 3rd May

HARROGATE.—Public Transport Association. Annual Conference. (Continued on 4th and 5th May.)

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. "Some Electromagnetic Problems," by Prof. G. W. O. Howe.

At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. Annual general meeting followed by "The Scientific Work of the Post Office," by Dr. L. E. Ryall.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Centre. Annual general meeting.

Wednesday, 4th May

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. Paper by Sir John Cockcroft.

PORTSMOUTH.—City Council Chambers, Clarence Parade, 6.30 p.m. I.E.E. Southern Centre. Annual general meeting. "Overhead Line Regulations," by H. W. Grimmitt.

PRESTON.—Harris Institute, 6.45 p.m. I.E.E. North-Western Centre. "Tidal Power and the Severn Barrage," by H. Headland.

ST. AUSTELL.—Faraday Hall, 3 p.m. I.E.E. South-Western Sub-Centre. "The Economical Utilization of Electricity in Great Britain," by R. B. Giles.

Thursday, 5th May

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Utilization Section. "Some Aspects of Agricultural and Horticultural Electrification in the United States," by F. E. Rowland.

Friday, 6th May

BOURNEMOUTH.—Grand Hotel, 8 p.m. I.E.E. Southern Centre. Conversazione and dance.

LONDON.—Mayfair Hotel. Scientific Instrument Manufacturers' Association of Great Britain. Annual dinner-dance.

Saturday, 7th May

LONDON.—I.E.E. London Students' Section. Visit to Chislet Colliery, Nr. Canterbury.